

MOTOR AGE

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In This Issue

Top Hat Shop Appearance Increases Maintenance Sales. <i>By Mandus Bridston</i>	18
Taking the Mystery Out of Diesel Servicing. <i>By Bill Toboldt</i>	20
Serviceman Sees the Highlights of 1935	22
Instructions For Mechanics Making Midget Motors. <i>By Robert Hankinson</i>	24
The American System of Enterprise	27
Service Chatter to End All Clutch Chatter	28
Readers' Clearing House	30
How Do You Locate An Engine Miss?	35
Eight Ways To Increase Service Sales	36
News—New Products—Merchandising Shorts	38
Tune-up Specifications	62
Advertisers' Index	84

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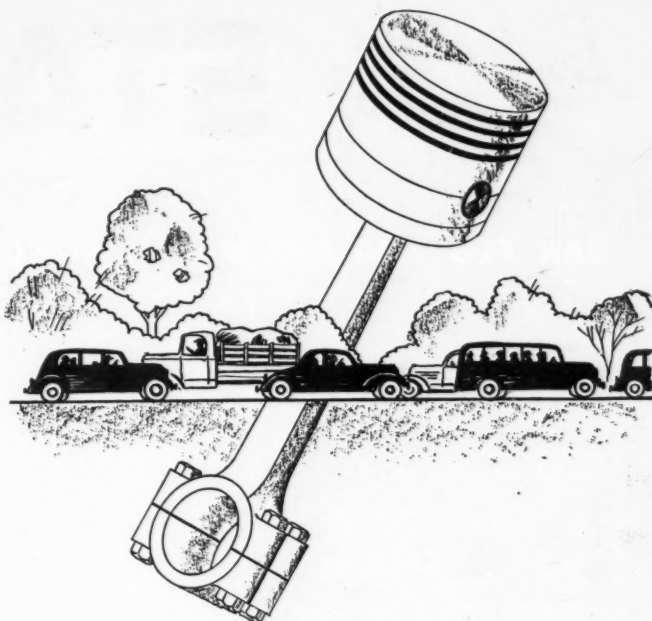
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January, 1936



More Than Ever

With the introduction of the new car models during cold weather, more than ever does it behoove manufacturer and dealer alike to bend every effort toward the protection of the vitals of automotive engines.

The heavy strain which cold weather starting places on the friction parts can be materially relieved by proper attention to lubrication.

The addition and use of "Oildag"* Brand colloidal graphite (in oil) in both crankcase and top cylinder lubricants forms on these moving parts a very closely bonded lubricating surface. This surface cannot be washed off by raw gasoline and is not affected by the temperatures which exist in the combustion zone. Hence, during that period when the engine is turning over with very little or no lubrication, the graphoid surface safeguards against metal-to-metal contact till full film lubrication is gained.

Automobile dealers throughout the country handling all makes of cars are reducing the number of "come backs" by using a supplementary lubricant which contains Acheson's colloidal graphite.

Now available gratis is our new Booklet H which summarizes the applications of "Oildag" as an adjunct lubricant.

*Reg. U. S. Pat. Off.

REG. U. S. PAT. OFF.
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COLLOIDAL PRODUCTS

ACHESON
COLLOIDS CORPORATION
FOUNDED [1908] AS ACHESON OILDAG COMPANY
PORT HURON • MICHIGAN

*Look at the
Record of*

STA-TITE

for 1935

JAN FEB MAR APR MAY JUN JUL AUG

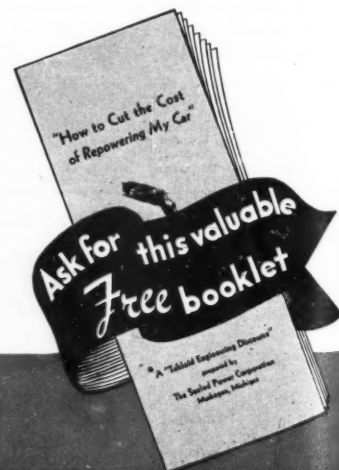


STA-TITE MONITOR NOTCH RING PERFORMANCE IN 1935 IS YOUR GUARANTEE OF PREFERENCE AND PROFITS IN 1936

OF COURSE you want to make more money in 1936 — and the RECORD made by Sealed Power Sta-Tites in 1935 PROVES that they are your best bet. . . . Sta-Tite PERFORMANCE, backed by the largest number of magazine advertisements in piston ring history, built Sta-Tite PREFERENCE. And increased PROFIT followed as a matter of course. . . . Start 1936 right. Don't stake your faith on promises. Capitalize on a proven product — proven by actual performance, actual preference, actual profits.

SEALED POWER CORPORATION, MUSKEGON, MICHIGAN

Alert repairmen are giving copies of this fine booklet to car-owners, and selling Sta-Tite Repowering jobs. Write to us, and find how you can put this splendid salesman to work in your shop.



SEALED POWER

PISTON RINGS, PISTONS, PISTON EXPANDERS,
PISTON PINS AND CYLINDER SLEEVES



THIS is the beginning of a new year and a good time to start planning how to improve business.

If you are devoting time to worrying about what your competitor is doing—which won't help you or your business any—possibly you could use that same amount of energy in cleaning, painting, rearranging and modernizing your service station and equipment.

It may attract more customers.

Then, doing each job right the first time will help to make 1936 a banner year.

This prescription makes a good business tonic for any season of the year.

Bill Toboldt



"Top Hat" Shop Appearance

**Stepping Out With a Smart Appearing Shop
Proved To Be Sweet Music For McKale's Inc.**

Sales Routine

SILENT salesmanship! A service station layout in itself a "silent salesman"! A station designed to merchandise maintenance with a maximum of speed plus efficiency!

These apply to "No. 18," the latest station to be opened by McKale's, Inc., Seattle, Wash.

The selling layout of successful "No. 18" is made up on five appearance factors:

1. White concrete is used in all major areas of the exterior, on the advice of a color expert who explained that white is more conspicuous, and may be seen from a remote distance, more than any other one color.

White is dazzling by day and brilliant by night, whereas many colors lose visibility under artificial lights.

At No. 18, the white is dramatized by modernistic lines of black trim, laid on horizontally.

2. White is used not only to make the station conspicuous, and thereby induce customers to "stop here," but to help create an atmosphere of cleanliness and hospitality. Window backgrounds, all woodwork, the display racks in the tire salesroom—in fact anything that can be enameled white is finished in that color. Special attention has been given to the floors, to create beauty and cleanliness. In the tire, sales and waiting room white tiling is used. In all instances, the white floors are kept immaculate with daily use of soap and cleaning chemicals when necessary.

3. Signs have been carefully se-

lected. The single word, "McKale's," is lettered in large Gothic design, with stainless steel, on the tower. The brake unit, with latest visual type equipment, is given special advertising attention in the form of a neon sign; another neon sign, at street level, identifies this latest station with the other McKale units. This minimum, but dramatic sign arrangement has been found more eye-appealing than a jumble of neon signs, such as one over the door of each maintenance department.

4. The layout definitely extends hospitality achieved by means of openness, spaciousness. In the greasing department, housed in a space 20 ft. x 30 ft. the white wall and floor background becomes a stage setting for the merchandising of lubrication. Two cars may be worked on at one time, and every phase of the equipment is in duplicate. All guns are served from a central gear lubricant, automatic-measuring power pump, of 16,000-lb. capacity. Metal labels on the equipment standards inform the customer as to special greases for

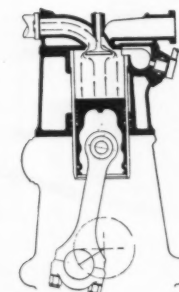
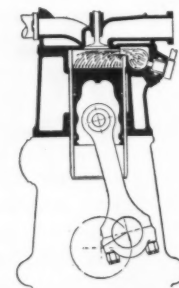
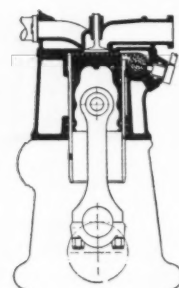
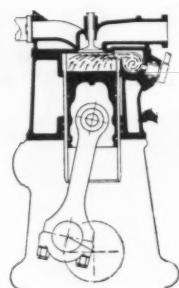
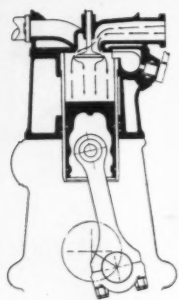
special purposes, and in all, 14 different types of greases are thus placarded. The 280-gal. waste tank is built beneath the floor. The electrically operated doors of the greasing unit are carried to the ceiling during operation hours. Valuable "openness" is also achieved with a disappearing front in the case of the brake department, with the addition of installing an electric control to carry aloft the steel H-section post, 8 in. through, centered in the 38-ft. front.

Plate glass display windows close in the combination tire, sales and waiting room and at the same time provide the hospitality so essential to a selling layout. These display windows, of which they are 50 ft., are rounded at the corners, to effect the utmost visibility for displays within. Also, the rounded corner positions prove to be good places to create exterior displays of merchandise - of - the - moment. Currently, this focal display is one built around mounted tires, to sell wheel change-over to Chevrolet and Ford owners driving cars prior to 1934-5 (Continued on page 64)



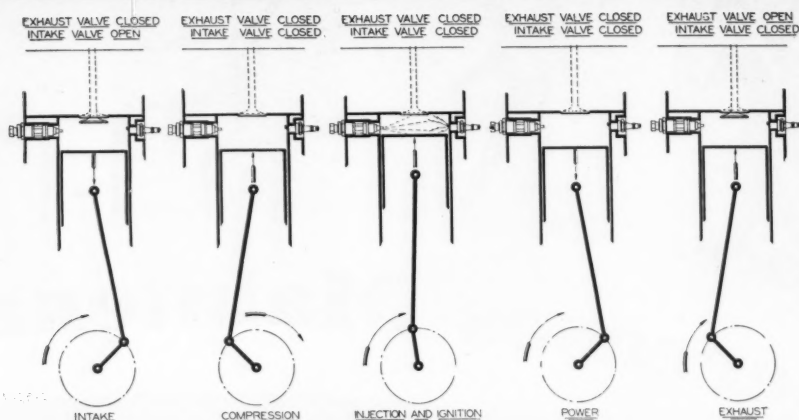
Increases Maintenance Sales





(Above) Cycle of events in conventional Diesel. Starting at the top—intake, compression, explosion, power and exhaust strokes

(Top of page) The Hesselman Diesel uses a spark plug to ignite the charge but it also uses the conventional four stroke cycle



Taking the Mystery out of Diesel Servicing

This is the First of a Series of Articles.

**Read 'em and Get the Low Down
on Diesel Servicing**

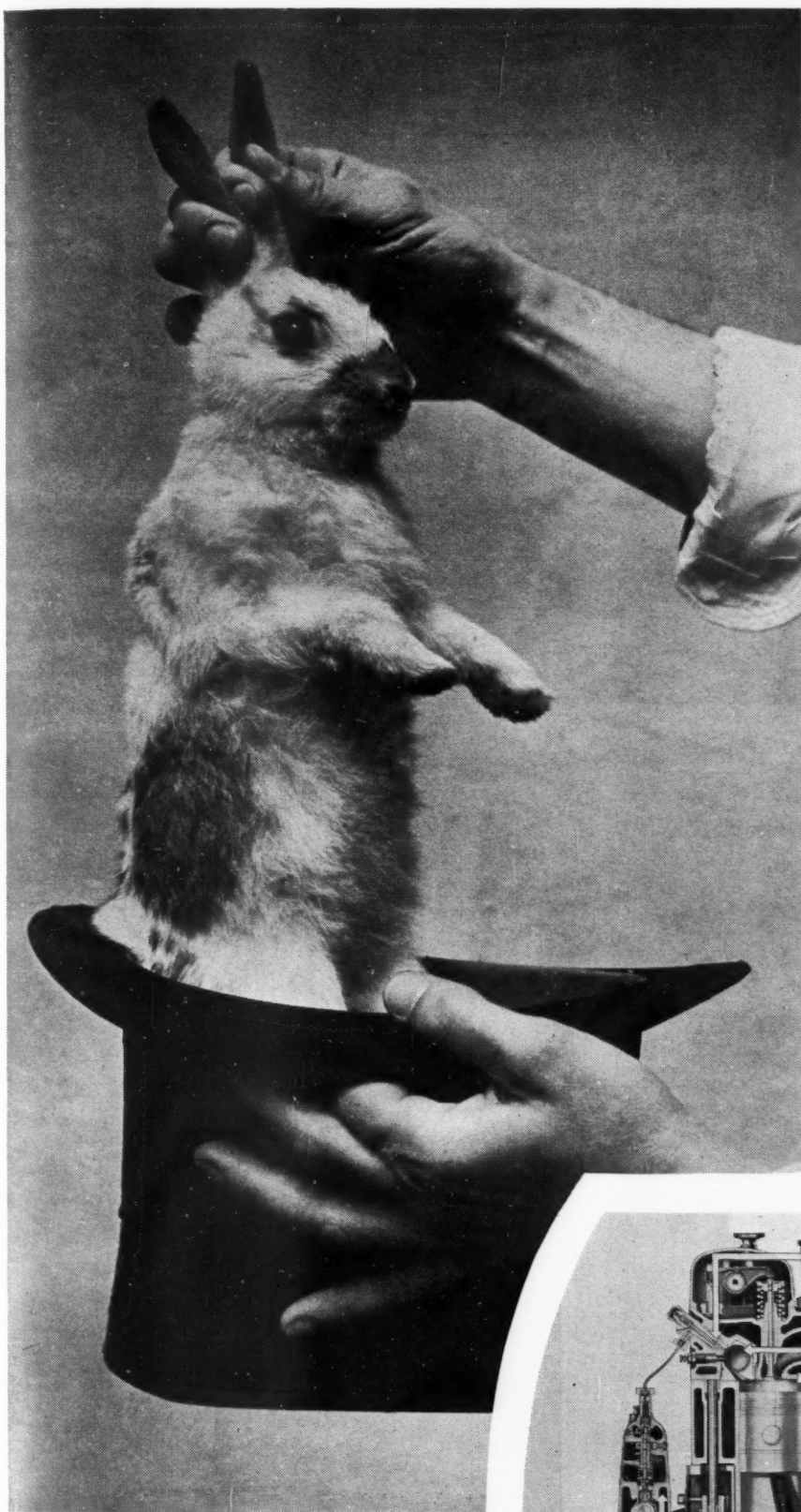
By Bill Toboldt

IT is interesting that many mechanics have shrouded the Diesel engine with so much mystery, kidding themselves into believing that its operation is difficult to understand and that to service a Diesel requires a cross between a scientist and a graduate mechanical engineer. Actually a Diesel is just the same as a conventional gasoline engine—except that in place of the carburetor and ignition system it has a fuel injection system, depending on the heat of the compressed air to ignite the injected fuel. A mechanic has therefore only to learn the details of the fuel injection system and he has mastered the essentials of the Diesel engine. Crankshaft, connecting rods, pistons, valves and camshaft are all

similar in design to the familiar gasoline engine.

While there are some two-stroke or two-cycle Diesels, automotive Diesels operate on the four-stroke cycle principle just the same as the gasoline engine—that is, intake, compression, power and exhaust strokes. However, on the intake stroke only air is drawn into the cylinders. This is then compressed to approximately 1/15th of its original volume (that is, the compression ratio is 15 to 1 instead of the 5 or 6 to 1 which is used in the gasoline engines).

Compressing air will increase its temperature. When air is compressed to 1/10th of its original volume it reaches a temperature of approximately 825 deg. Fahr., if



compressed to 1/15th of its original volume it will have a temperature of approximately 1050 deg. Fahr., assuming that no heat is lost into the cylinder walls.

DIESEL fuels will ignite at temperatures below 1050 deg. So after the air is compressed within

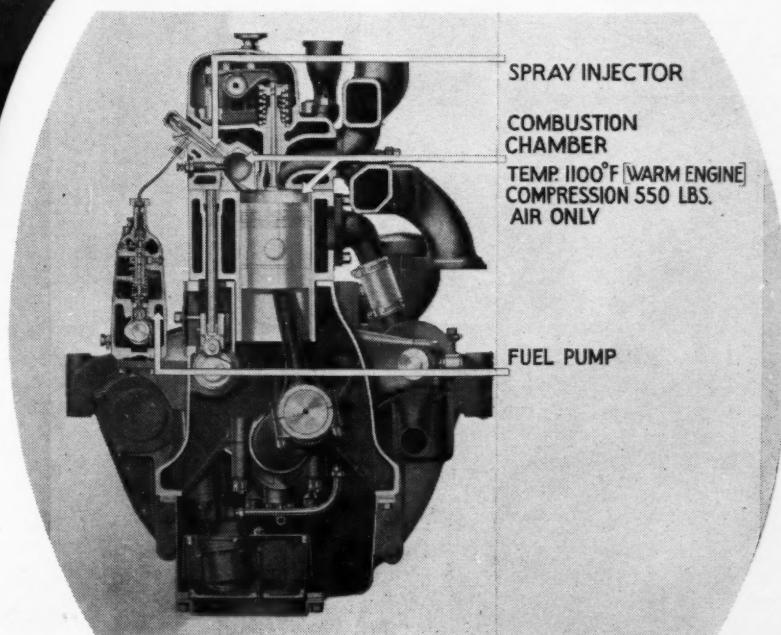
the cylinder, raising its temperature, the fuel is injected or sprayed into the combustion chamber, where it is immediately ignited by the hot compressed air.

Measuring each "shot" of fuel and injecting it into the combustion chamber is of course the trick. There are three general systems in use—the individual fuel pump; the rail system; and the method used in the Cummins Diesel.

In the rail system there is a fuel supply pump which maintains a high pressure on a rail or pipe header. Small pipes run from the header to the spray nozzles, one for each cylinder. Between the header and the spray nozzle is a cam-operated needle valve. The size of the valve and the shape of the cam serve to measure the amount of fuel to be injected into the combustion chamber. At the proper instant the needle valve is opened by the motion of the cam and the fuel is forced under pressure into the combustion chamber. Naturally, the pressure on the fuel has to be high so as to force the fuel against the pressure of the air in the cylinder.

(Continued on page 64)

Sectional view of a conventional Diesel engine. Note the injection system



Serviceman Sees



1935 was the greatest automotive year in Production and Sales since 1929. New passenger car registrations are estimated at 2,750,000.



Alfred P. Sloan, Jr., summarized the progress of 1935 and pointed to the goal of 1936 when he said, "it is perfectly possible to accelerate the progress of 1935 and to broaden it into a sound, forward movement extending all along the line of constructive endeavor."

1935 saw the birth of the Motor Vehicle Maintenance Trade Code, its short life and the sudden death of the NRA, when the Supreme Court ruled the Recovery Act "unconstitutional."



Safe driving became more prominently a topic of discussion in 1935... despite the fact that the whole industry has labored for years to make safer and more dependable automobiles.



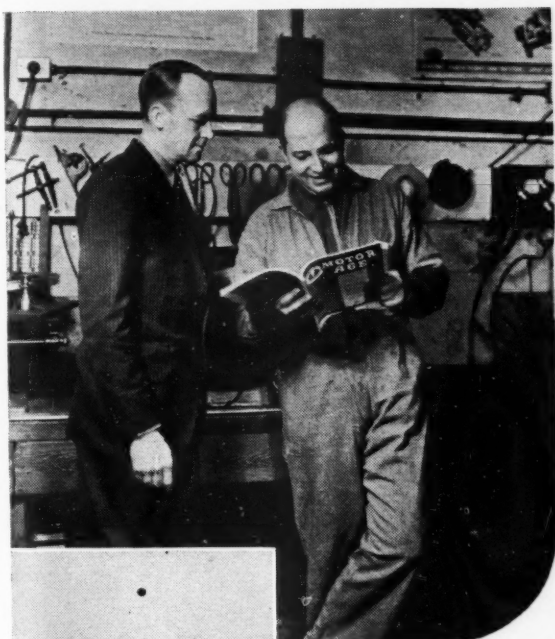
Henry Ford predicted that his company would produce 1,000,000 cars in 1935. One afternoon last fall a black Fordor sedan moved along the assembly line at the Ford plant in Dearborn. It was the one-millionth Ford unit made in the United States in 1935.

Above photo, copyrighted, Kauffman & Fabry

The Highlights of 1935

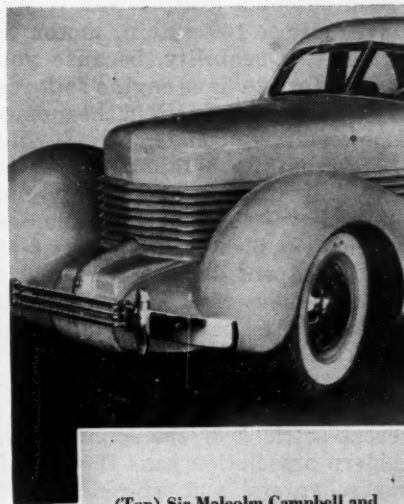
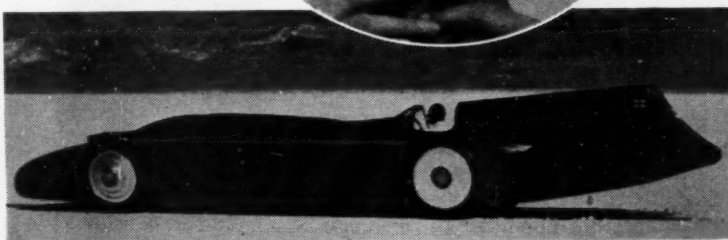
Pictorial Résumé of Some of the Outstanding Automotive Events of Last Year

By Frank P. Tighe



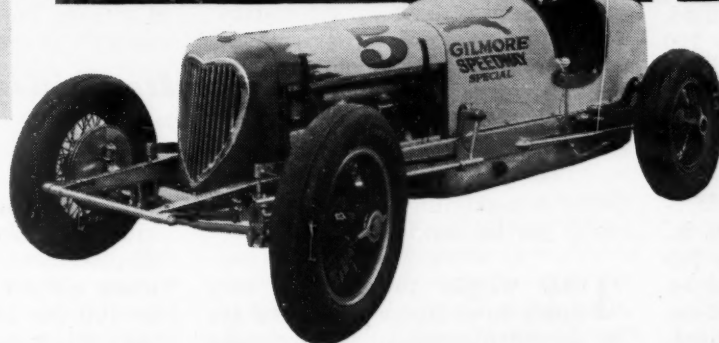
Motor Age: for independent repair shops. Editor: Bill Toboldt. For thousands of hard working automotive servicemen, the re-birth of Motor Age, a publication as old as the industry itself, was the biggest news of 1935. Joe Scheer, Philadelphia maintenance man, gives the new Motor Age a smiling O. K.

(Below) Kelly Petillo's new Indianapolis Speedway record of 106.240 m. p. h. at the 500 mile Memorial Day classic.



(Top) Sir Malcolm Campbell and Bluebird in which he established a new world's record traveling over the Bonneville Salt Flats of Utah at 301.337 m.p.h.

(Above) Fall auto shows saw the introduction of the Cord Front Drive, the Lincoln Zephyr and many another innovation. Greatest change of all was the changed buying habits which resulted in a strong retail demand for new cars.

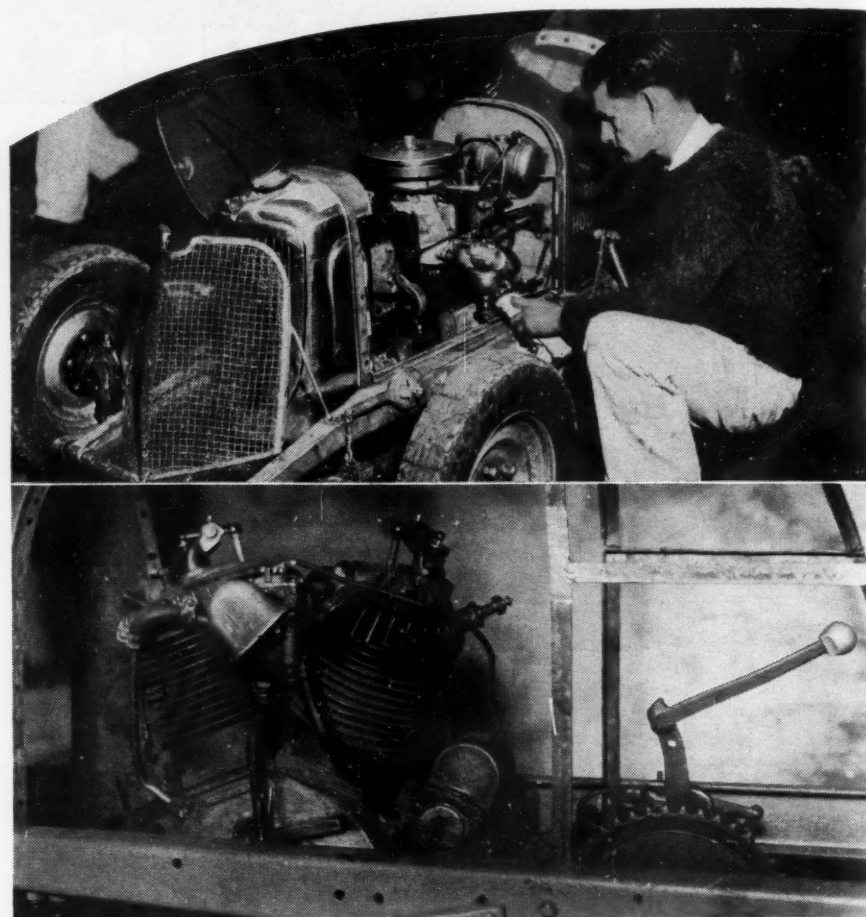


Right — Ronny Householder, a consistent winner in the Midwest circuit, inspecting his Evinrude-Elto "460" outboard engine.

Right, lower—A typical motor-cycle installation, showing location of engine, transmission and clutch.

ONE of the most, if not the most important decision to make when building a midget racer is selecting the powerplant or engine. The selection depends to a large extent on the type of motors available, whether the regular four cylinder automobile engine, an outboard motor or a motorcycle motor. All three have been used with varying degrees of success. However, when making the selection, there are three things that must be kept in mind. They are weight, durability and speed. Weight first, because you can't expect to get much speed out of a load of iron if you have only a 100 cu. in. motor to drive it. Durability, because you can't afford to have engine failures if you expect to finish in the money and keep it up consistently during the season. Each failure costs you not only the prize money you might have won, but the expenses of the trip plus the actual cost of repairs. Speed, because after all is said and done, a race is a race, and you've got to be fast to finish up with the leaders.

Rules governing the specifications of midget cars vary in different sections of the country. An eastern association bans the use of superchargers and specifies that only one carburetor shall be used, piston displacement limited to 100 cu. in. for four-cycle engines and 61½ cu. in. for two-cycle engines. The mid-western Indoor Auto Racing Association permits superchargers on four-cycle engines that are limited to 50 cu. in. displacement, with a maximum of 85 cu. in. displacement for a four-cycle job not using a supercharger, and on two-cycle engines limited to 42 cu. in. a supercharger may be used,



Instructions for

Mechanics Making Midget Motors

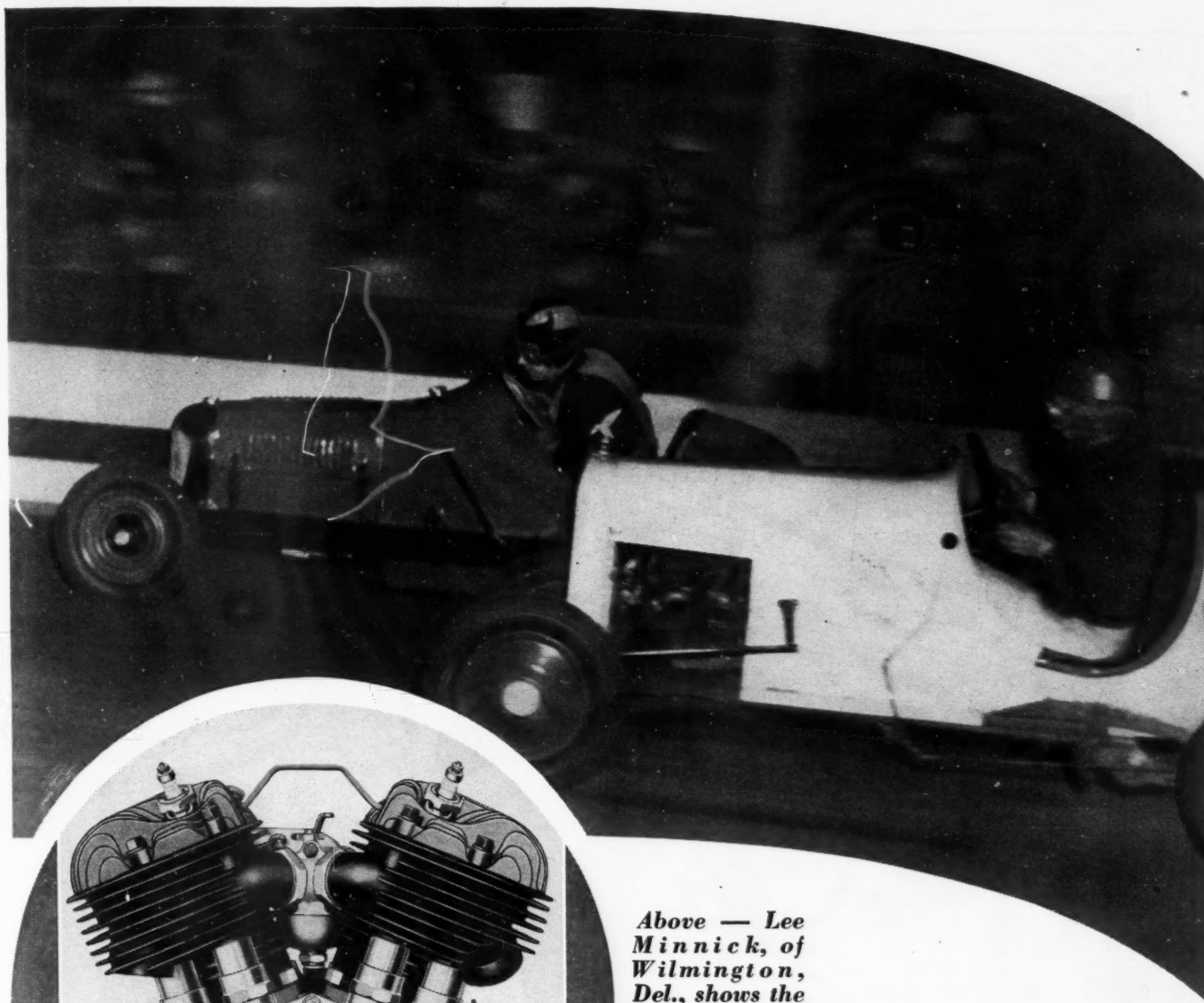
Weight, Speed and Durability Are Essential Factors In Making The Engine Fit The Midget

By Robert Hankinson

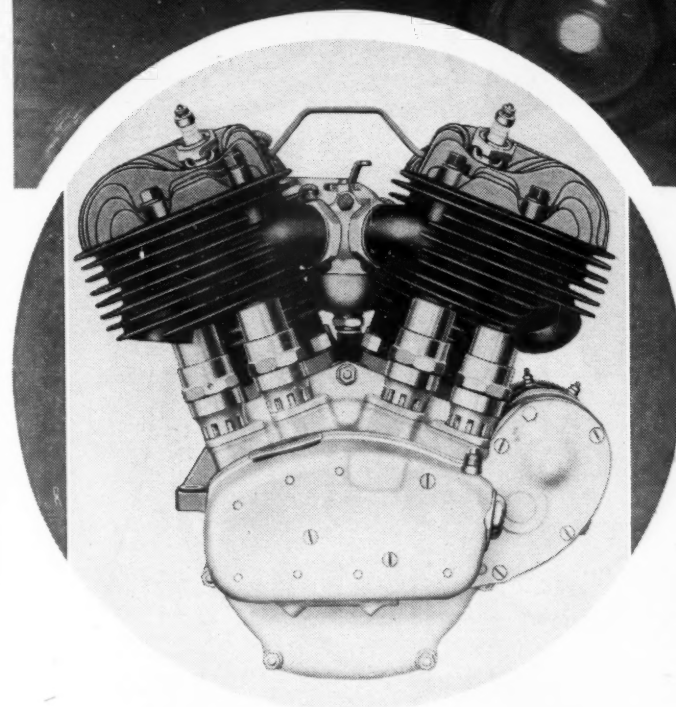
with a maximum displacement of 61½ cu. in. without a blower.

THE weight problem is very much in evidence when you try to cut down a regular four-cylinder

engine to bring it within the maximum specifications of 100 cu. in. displacement. For example, to bring a Ford Model T engine down to 100 cu. in. it would be necessary to install a sleeve in each



Above — Lee Minnick, of Wilmington, Del., shows the way home at Atlantic City.



Left — A Harley - Davidson 74 cu. in. engine, popular with Midget drivers.

cylinder, changing the bore from $3\frac{3}{4}$ in. to approximately $2\frac{3}{4}$ in. The Model A job would have to be brought down from $3\frac{7}{8}$ in. to about $2\frac{3}{4}$ in. This would mean the addition of some weight, and considerable labor in view of the fact that it would be necessary to grind out the old cylinder walls to allow water contact with the new sleeves in order to provide ample cooling.

There are several points that contribute to increased engine speeds, any one of which would have some effect, but which taken

together will bring out quite an improvement in this respect. A rich carburetor mixture, obtainable by increasing jet sizes or by adjustment, is helpful in getting higher top speed. A larger carburetor, increased from $\frac{1}{4}$ to $\frac{1}{2}$ in. over the original size will aid in delivering a greater charge to the cylinders, although it will bring about difficulty in starting and idling. Where permissible, additional carburetors may be installed—one for each two cylinders. This would mean building a special intake manifold, and

it would be advisable also to change the exhaust manifold by making an outlet separate for each exhaust port, carrying the outlet straight out from the engine, through the hood, and then combining them in an exhaust pipe approximately 4 in. in diameter. If two carburetors are not used, the intake manifold might be increased in size, and the inside sand-blasted and possibly plated to insure a smooth surface and remove all possible obstructions to a free passage of intake mixture.

VALVES should be accurately refaced and the block resealed so that the valve seats have a width of $\frac{1}{16}$ in. In narrowing the seats, material from the port underneath the valve should be reamed out to give free passage to the gas. When the grinding job is finished, the edges of the valves should be rounded from the top edge of the seat upward, so that the overall diameter of the valve head is the

(Continued on page 78)



"This reminds me, Strangler, my car needs new clutch plates!"

By Morgan Farrell



The American System of Enterprise

***What It Is, and
Why It Will Go On***

HALF-DROWNED by the flood of confused thinking, irresponsible utterance and mischievous activity, now overwhelming the world, even the patient and intelligent American citizen has

been driven of late to question the soundness of the institutions which have made his country great.

"Can these people be right?" he asks. "Is our splendid day of Em-

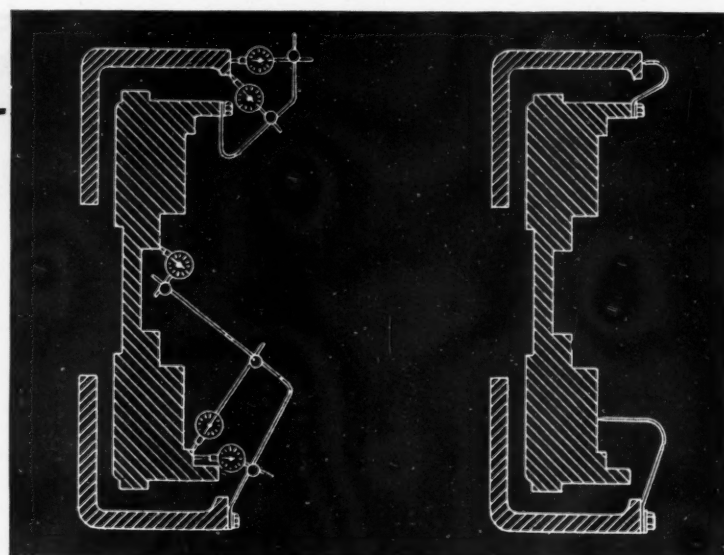
pire-building over? Is it true that our system of enterprise could only work when we had a continent to develop? Must we now settle down to a bread-ticket existence—a life of standing in line, of hopeless self-denial?"

That is what we hear on the street corners, in the college classrooms, in the very halls of the Government founded upon this American system of enterprise. From the millions of Marxists, Leninites, Hitlerites and the rest rolls a thunder of assurance that Capitalism has been slain and that Communism reigns in its stead. But even that is not enough. The whole world must be won over to the Third Internationale, or to Fascism, or to National Socialism, or what not—preferably by force.

Well, John Citizen could stand that without much emotion—but when the same doctrines now come
(Continued on page 61)

Checking alignment of flywheel
and flywheel housing

Service Chatter



To End All Clutch Chatter

Repair Procedure on Misalignment:

The Cause of Clutch Troubles

OF the many factors contributing to unsatisfactory clutch operation, particularly clutch chatter, probably the most difficult to determine is that of misalignment between the engine and the clutch or flywheel housing, and between the flywheel housing and the transmission. This condition will not only cause clutch chatter, but will eventually cause the clutch-driven plate to break at the hub.

Checking for the point of misalignment must be a thorough job, as the cause may be some distance away from the clutch. For example, in the case of a car using three-point engine suspension, the front mounting may be loose and allow the engine to move laterally during operation and thus cause a strain to be placed on the clutch. Under such conditions, the misalignment would not be in evidence when the car was being checked on the floor. Misalignment of the rear axle housing on those jobs using a torque tube will throw a heavy lateral strain on the transmission end plate which will follow through the transmission and result in misalignment at the clutch main shaft. This condition may not have existed long enough for it to cause

unusual rear tire wear, and would only be discovered when checking the distance from the center of the spindle to the center of the rear axle shaft on each side.

The flywheel should be checked for running true. During assembly of the flywheel to the camshaft, burrs from drilling might not have been removed, or dirt might have existed on the flange face of the crankshaft so that the flywheel does not run true. This can be checked by attaching a dial indicator to the motor block so that the button of the indicator rests against the face of the flywheel. Turning the crankshaft over slowly and watching the indicator will show whether or not the flywheel is running true. A run-out of .005 in. or less is generally considered as being satisfactory.

THE flange on the motor block to which the clutch housing is bolted should be checked for being

true with the face of the flywheel, and may be checked by reversing the position of the dial indicator as mentioned above; that is, by attaching the indicator to the flywheel with the indicator button against the flange on the motor block, and turning the crankshaft over slowly, watching the gage.

If the crankshaft bearings have ever been replaced and line-reamed, there is the possibility that they were reamed a little off center, with the result that the crankshaft and flywheel are not in the center of the housing flange. This may be checked by chalking the flywheel housing flange to which the clutch housing is bolted and attaching a stiff wire to the flywheel so that the other end of the wire will contact the center of the bolt holes in the flange. Then by turning the flywheel over, the end of the wire should make a mark in the chalk directly through the center of all



Right — Misalignment of rear axle and torque tube in relation to transmission

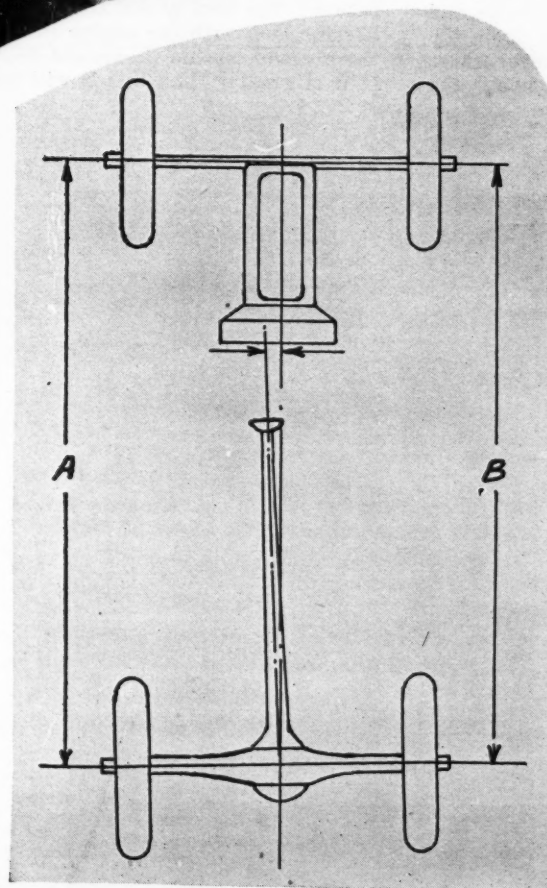
of the bolt holes. If it does not it indicates that the crankshaft is not centrally located.

The front flange of the clutch housing should also be checked. This can be done by installing a dummy shaft or mandrel through the center of the transmission and clutch housing assembly, attaching a dial indicator to the end of the shaft with the button of the indicator

resting against the housing flange, and turning the shaft slowly, watching the gage. If the error exceeds .005 in. the surface should be machined.

When installing the clutch housing to the flywheel housing care should be exercised to prevent distorting the housing. Bolts should be drawn up a little at a time, and alternately from one side of the housing to the other, to insure an even tension all the way around the flange.

A common practice that must be avoided is that of removing the transmission assembly from the flywheel housing without supporting the transmission with a jack, and thus relieve the strain on the clutch plate hub. When the bolts holding the transmission to the housing are removed and the transmission is allowed to hang without support, all of the weight is thrown on the clutch hub. This has a tendency to bend the disk, and each time the clutch shaft turns over the driven plate must adjust itself, operating as a universal joint until the metal eventually breaks around the hub.



ALIGNMENT
Within the clutch itself is confined principally to the adjustment or positioning of the clutch release levers in the pressure plate assembly. This is particularly true of the single plate type in which three pressure plate release levers operate against the thrust bearing release plate. These levers, sometimes called "fingers," are adjusted for equal height from the thrust side of the pressure plate. In order to make
(Continued, page 82)

The Readers' Clearing House

CARBURETOR LOADS UP; ENGINE WON'T IDLE

We are having trouble with a 1934—840 Pierce Arrow. The carburetor keeps loading up and engine will not idle. This car has a Stromberg carburetor EE 33. We cannot get enough air in the mixture. Would you advise getting smaller jets or increasing air passage holes? E. S. Niehof, Melbourne, Ky.

WE do not believe that the way to correct this condition will be to either install smaller jets or increase the air passage holes. The trouble is not that you are getting insufficient supply of air but rather that you are getting too much gas and the gas supply will have to be cut down rather than the air supply be increased.

The first point to check is, of course, the float level and along with that the condition of the float needle valve and seat. Fuel level is 9/16 in. from the top of the bowl and if the operator is using Ethyl treated gasoline the

fuel level can be 5/8 in. Then, I would check the needle valve and seat and if there is any doubt as to the needle valve seating properly, I would install a new valve and seat. The next point to look for trouble is in the accelerating pump by-pass valve as this valve sometimes sticks in a partially opened position allowing a steady bleeding of gasoline into the venturi and, of course, interfering with the idle adjustment. This valve is inexpensive and the installation of a new one will oftentimes clear up a poor idling condition. I would next check the idler adjusting screw as it is entirely possible that someone has screwed the adjustment all the way into the seat and damaged the needle valve so that you are unable to get the proper idle adjustment with this screw. After being sure that these points are correct, I would then check the fuel pump pressure. This can be done by inserting a pressure gage in the line between the fuel pump and the carburetor and, with the engine running, the pressure should be around 2½ lb. If it is greater than this it will force

the float needle valve off its seat and, of course, flood the carburetor.

If the pressure is too high it can be reduced by installing a thicker gasket between the fuel pump and the cylinder block.

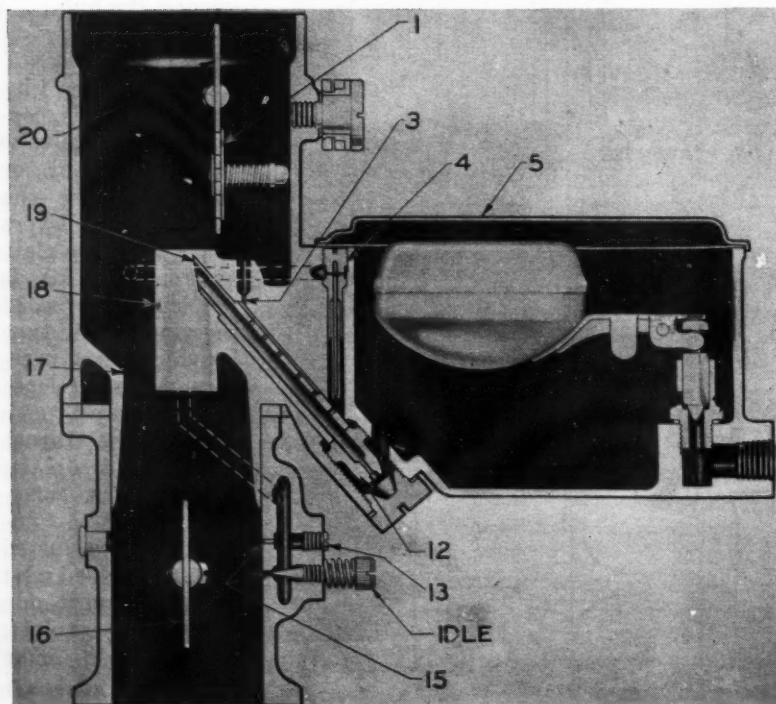
We believe that if you will check the points listed above you will be able to correct this condition. However, if there are any other points on which you think we can be of assistance, we will be very glad to have you write us.

TRANSMISSION JUMPS INTO FREE WHEELING

I have in my shop a 1928 or 1929 Hupmobile Model S, six-cylinder with free wheeling. This car has been in different shops to find out why, when you are going along in high gear, all at once it goes into free wheeling. The owner claims there is a small spring in the free wheeling which disconnects and then jumps into free wheeling. I haven't looked this job over yet, but thought I would write to you for first-hand information.—J. Baur, Ingram Service Station, 2709 Windgap Road, Ingram, Pa.

ON your Hupp free wheeling unit it is entirely possible that the rollers and cams in the free wheeling unit are so worn as to cause the difficulty you are experiencing. If such is the case, the only thing to do is to replace the worn parts. However, before doing this, I would suggest that you thoroughly wash out the transmission and free wheeling unit with kerosene and then refill with the proper type of lubricant, as the operation of the free wheeling unit requires clean lubricants of the proper type.

In addition, I would suggest that you carefully adjust the free wheeling control. The easiest way of doing this is to disconnect the cable from the control arm at the free wheeling housing and then move the arm to the extreme position so that the free wheeling will be locked out. Then, after placing the control button on the instrument panel in the corresponding position, reconnect the control cable to the control arm at the housing. Then, if this does not overcome your trouble, replace the worn parts.





Bill Toboldt

Continues to answer the ever-increasing number of questions written to the Readers' Clearing House. Robert "Hank" Hankinson, technical editor, lends a helpful hand in conducting this department. These experts invite you to discuss your mechanical problems with them. When writing please use your business letterhead or attach a business card, to indicate your connection with the automotive trade. Name and address will be withheld from publication on request.

MAY BE AIR LEAK AT THE INTAKE MANIFOLD

I have been unable to get a 1929 Model A Ford motor to idle properly. It is a factory reconditioned motor and has not run over a couple of thousand miles. The compression is O.K., carburetor clean, jets open, the plugs are new, the points are clean and retard correctly. The motor operates perfectly at all speeds except idling. It cannot be idled down without stopping. It just started to do this of late. It would idle nicely when first installed. Any information you can give me will be appreciated. Markus Johnson, Johnson's Auto & Electric Shop, McIntosh, S. D.

THE condition you describe sounds very much like an air leak at the intake manifold or at the gasket between the carburetor and the intake manifold. There also might be an air leak between the inlet valve guide and the block. We would suggest first changing the manifold gasket and second, the gasket between the carburetor and the manifold. While you have the manifold off for the installation of new gaskets, we suggest that you check the manifold on a sur-

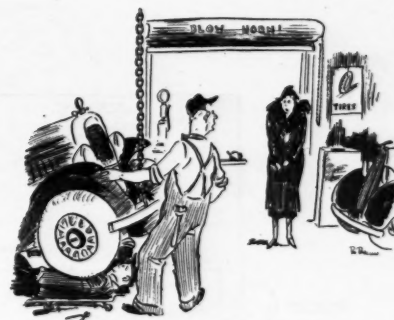
face plate to be sure that it is not warped.

It might also pay you to check your ignition distributor, particularly the shaft so as to be sure that it does not have excessive side play and that the tongue and groove connection of the shaft is not worn. Also check the electro-lock cable.

WHAT TO DO ABOUT A ROUGH RIDER

We are having trouble with a 1933 Dodge, Model D.P. The car rides hard up to 35 m.p.h. We have checked tires, of course, and shocks but have not removed metal covers from springs. Up to speed mentioned car rides as if tires were inflated to around 50 lb. Can you suggest any remedy for this? Clifford E. Raynor, Raynor's Garage, Liberty Ave., Westhampton Beach, N. Y.

WITH reference to your query on the 1933 Dodge, insofar as we know there was no change made in the shock absorber calibration of the 1933 Dodge so as long as the shock absorber itself has a sufficient supply of oil and has not become air-bound, we do not believe that the trouble will be located in this unit. We note that you have already checked tires and by that we assume that you have checked the tire pressure. We know you realize there is a wide variance in the reading as given by the automatic air pressure indicators of the average filling station air hose and unless you have checked the air pres-

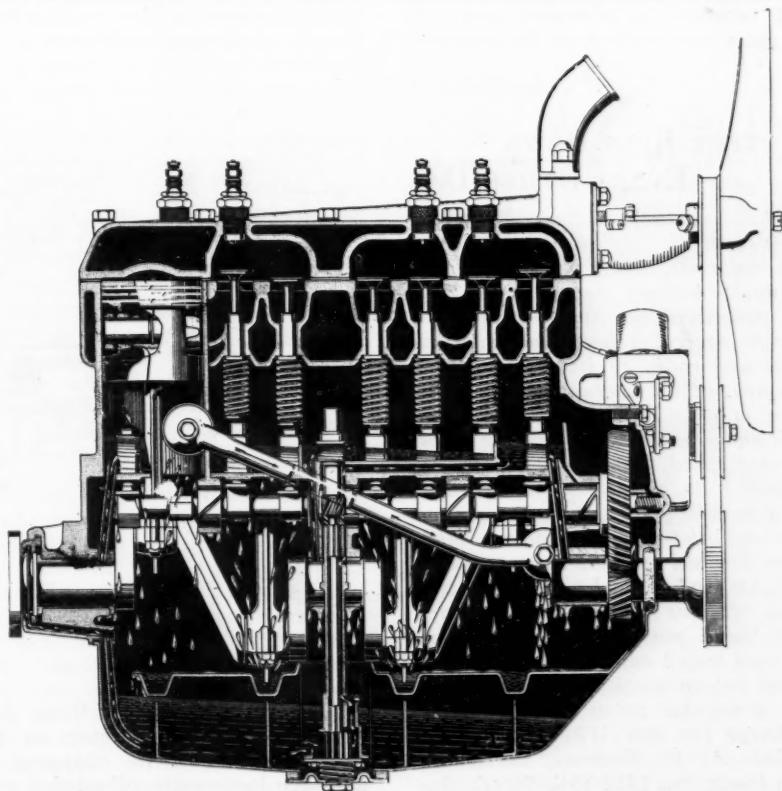


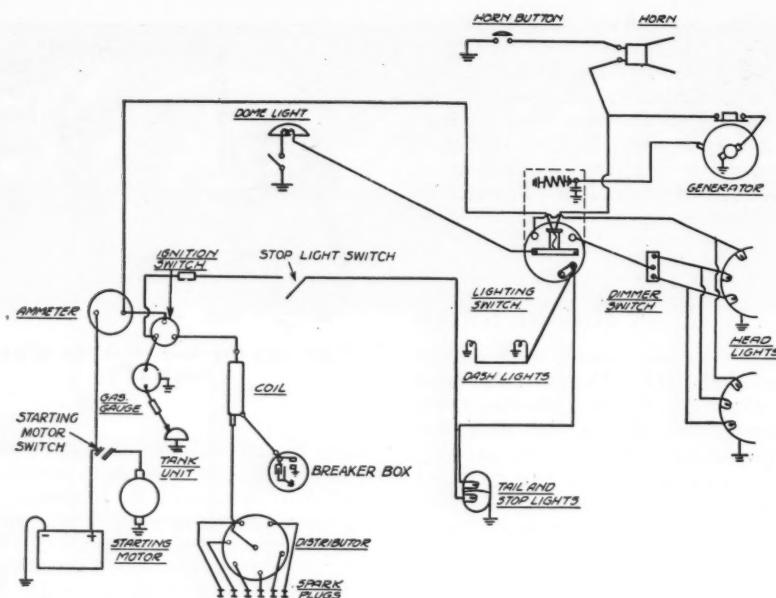
"Are you the lady with the slipping clutch?"

sure in the tires of this car with a hand gage that you have previously tested to be sure of its accuracy, we'd suggest you do this as it is very important that tire pressures be right and that they be equalized. We believe you will find 32 lb. of air to be sufficient for the 1933 Dodge.

The point we would check particularly would be the spring shackles and the springs. The spring shackles first to see that they are not too tight causing a bind and thereby destroying the shackle action. Then, we would suggest that the spring covers be packed with a special spring lubricant. This operation can be performed by using a special C-clamp fitting and does not necessitate removing the metal cover from the spring.

We would also check the body bolts and the insulation between the body and the frame. Loose body bolts can give a combination of sensations one of which is hard riding.





GROUND FIELD TERMINAL WHEN READING AMMETER

Have been having trouble getting generator to charge over 8 or 10 amps on 1934 and 1935 Chevrolet. Have cut resistance in circuit with no results. Also, set third brush with no better results. Would like more information on this type generator, also 1934 and 1935 Plymouth. Lewis Eisler, Eisler's Garage, 20820 Naumann Ave., Euclid, Ohio.

I AM wondering if you are taking your ammeter readings with a master ammeter at the generator and are grounding the field terminal to the frame of the generator. Unless the field terminal is grounded you will not get a true reading on the ammeter

of the output of the generator. You state that you are getting between 8 and 10 amps., whereas the maximum for this generator is from 11 to 15 at 60 m.p.h. It would seem to us, therefore, that you are not grounding the field terminal when taking your reading.

The third brush in this type generator should be set so that it is about two commutator bars from the positive brush. This setting should not be disturbed as the charging rate of the generator is governed by the resistance unit in back of the lighting switch. The standard or production resistance unit is one ohm. If your difficulty is that your battery does not receive sufficient charge, we would suggest changing this resistance unit to one of $\frac{3}{4}$ ohm resistance.

just the charging rate on this unit to see if you cannot bring it up to 21 amperes, and if you cannot do this the generator should be checked on an electrical test stand to make sure that the armature, commutator and field coils are all in good condition and that there are no grounds or short circuits present anywhere in the unit.

Before attempting to set the charge rate on the generator, connect a jumper wire from the fuse cup to the ground. This cuts out the voltage control unit, which is necessary while adjusting the charging rate. Be sure to remove this wire after the charging rate is set. Then, with the generator mounted on the test stand and cooled down to room temperature, remove the commutator end cover band and shift the third brush rocker ring in the direction of rotation or toward the main brush to increase the charging rate. The charging rate should be adjusted to give 21 amperes at 8.6 volts. The car ammeter shows only the current flowing into or out of the battery and does not give the total generator output reading. It is therefore necessary to adjust the charging rate on a test stand as previously outlined.

Now, in regard to the adjustment of the voltage control relay, with the armature (2) in the extreme downward position, contact points opening (9) should be set at .008 in. to .013 in. Adjustment is made by bending the upper contact support legs. Connect an accurate voltmeter between the terminal marked "Bat" and the ground.

With the generator at room temperature, the control relay points (9) should open at 8.3 volts and close at 7.3 volts. This control unit is over-compensated for temperature change and therefore the hot opening and closing voltages will be lower than the cold opening and closing voltages.

When checking the opening and closing voltages, cycle the regulator before taking the reading. To cycle the generator, increase the speed of the generator until the voltage is reached at which the points open, then decrease the speed until the points just close. After making this cycle, obtain the true voltage readings at the instant the points open and close.

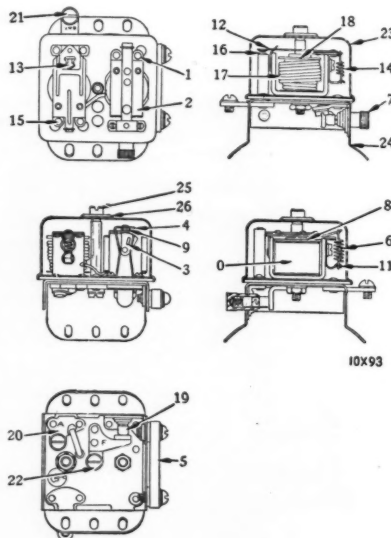
The cover must be in place when checking voltage readings. In addition, do not overrun the voltage reached at each point. If specified voltage cannot be reached, insert a special resistance of .25 ohm in the charging circuit.

Then increase or decrease the voltage opening by increasing or decreasing the armature spring (6) tension. This is done by bending the lower spring hook (11). Closing voltage is increased by increasing the armature air gap. It is cut down by decreasing the gap. It is only necessary to turn the lower armature stop (3) slightly to obtain the closing voltage adjustment.

BATTERY RUNS DOWN EVERY OTHER DAY

I have a 1935 DeLuxe Plymouth sedan with a Stewart-Warner six-tube radio set. Now my trouble is a run-down battery every other day. The generator on this car carries a voltage control relay, and with all lights and radio off its top output is 15 amps. at an average motor speed of 20 m.p.h. With lights and radio on, it shows a discharge of four amps. at same speed.

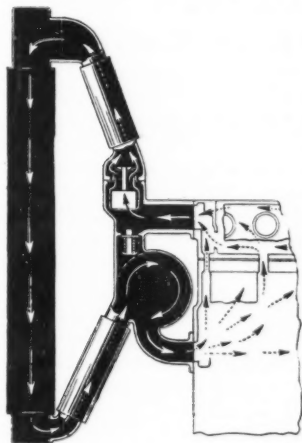
Now, I do quite a bit of driving, but it is mostly stop and start around town and a lot at night with my lights on, so you can see that between starter, lights and radio I run my battery down. I have taken off the voltage control and put on a straight relay and that way I can get the generator to put out as much as 30 amps., but with a regular relay it generates a discharge current. What do you say to do?—A. B. Newman, Newman's Auto Parts Co., 1942 15th Street, Augusta, Ga.



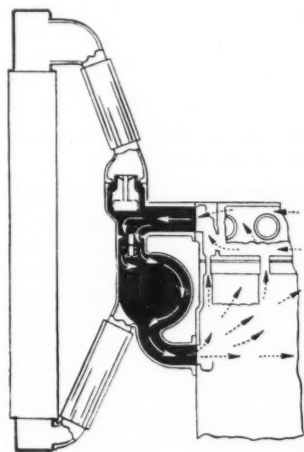
EITHER there is something defective in the generator on your 1935 Plymouth or the charging rate has been incorrectly adjusted. I would suggest that you first carefully ad-

TO TRACE THE TROUBLE TEST THE THERMOSTAT

I am having trouble with a 1934 Buick 8 (40 series). When this is driven 50 or 55 m.p.h. for about 20 miles, it is boiling and will take about 1½ gallons to refill radiator. I have installed all new water gaskets and hose, removed head, cleaned carbon, ground valves, checked timing, valves and ignition, new head gasket, tried different thermostats—but with the same results. I can remove the thermostats and all is O.K. But, of course, then the hot water heater won't heat. This car has only been driven about 15,000 miles. An Illinois Subscriber.



JUDGING from your description, it would seem as though this difficulty was caused by the thermostat even though you have tried other thermostats. We are wondering if you have tested the thermostats in a bucket of water to determine the temperature at which they open and whether or not they open the full distance. The fact that the car does not develop this trouble when operated without



the thermostat would seem to indicate that the circulation system, particularly the radiator core, is in good order and is not clogged up as is often the case in an overheated condition.

We suggest that you test the thermostat by placing it in a bucket of



"I don't want to spoil your fun but I'd like five gallons of regular!"

hot water, first testing the temperature of the water with a thermometer. The thermostat should start to open at 140 deg. F. and should be fully open at 170 deg. If you find the thermostat operates properly, we suggest that you be extremely careful when installing it in the connection to see that it is square on its seat and that the valve has room to open its full travel.

NEW RINGS INSTALLED; OIL CONSUMPTION WORSE

I am driving an Auburn 8-77 1928 model. The mileage now is almost 60,000 miles. We installed standard size rings as the pistons only showed .006 in. wear on wall over standard. Valve guide packing was also installed. It has burned oil since the job was completed and has been steadily growing worse even to blowing by the spark plugs. These are new and the car has been tuned up for Ethyl gas so timing points and carburetor are first rate. The car has gone around 3000 miles since the ring job and is burning a quart to fifty miles of first grade eastern oil. Any help you can give me on the control of oil on this job will be greatly appreciated. W. R. Hurl, Hawthorne Ave. Garage, 4424 S. E. Hawthorne Blvd., Portland, Ore.

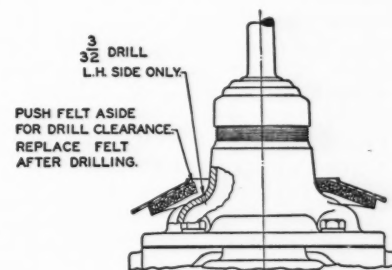
ON your 1928 Auburn that is using an excessive amount of oil, I would suggest that first of all you make sure that there are no oil leaks present, by attaching a large sheet of oil cloth underneath the engine and then taking it out for a good long drive. Naturally, if there are any leaks present, the oil will be caught in the oil cloth. If you find that the car is leaking oil, it will be necessary to recondition the main bearings and also make sure that the oil pan gaskets are in good condition.

However, some of these Auburns have the air intake of the carburetor connected to the valve chamber. If such is the case on your particular model, I would suggest that you remove this connection, for all it does is draw out oil from the valve chamber and pass it in the combustion chamber. Naturally your oil consumption will be beyond reason.

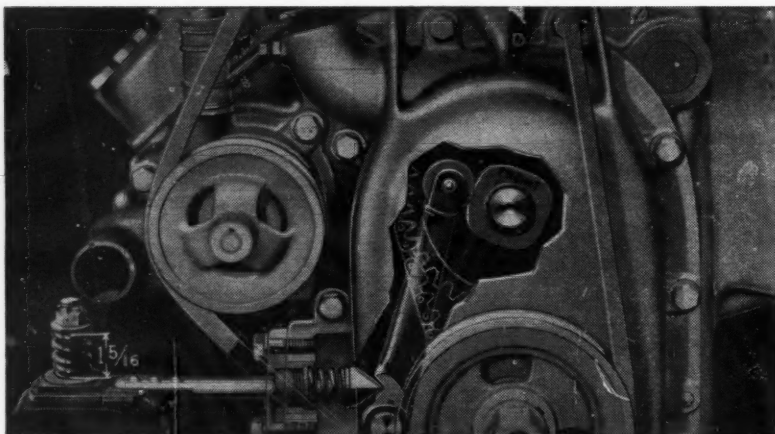
It is also advisable to make an oil pressure test on this job, for if the bearings are throwing off an excessive amount of oil, the rings will not be able to hold it down. Furthermore, if this particular job has squirt holes in the upper half of the connecting-rod bearings, these should be closed.

UNIVERSAL JOINT HOUSING OIL LEAK

I am having trouble with a grease leak at the vent in the universal joint housing on a 1935 Pontiac. Is there anything I can do to overcome this trouble?—New Jersey Subscriber.



TO overcome the oil leakage at the vent on the universal joint housing on 1935 Pontiac cars, the vent should be soldered or replaced with a screw (Pontiac part No. 106974—¾ in. 16 x ½ in.). Then drill a 3/32-in. hole in the transmission case as illustrated. This will overcome your trouble.



A KNOCK THAT COMES AT 40 MILES AN HOUR

A 1930 Oakland V-8 came into my shop with a knock that sounded like a loose rod. I took up the rods but they were not very loose and it didn't stop it. The knock seems to come when the car is traveling about 40 m.p.h. I tried shorting it out at that

speed but can't find it in any certain cylinder. The oil pressure is good. Can you give me any information on this? A Wisconsin subscriber.

JUDGING from your description I am inclined to believe that this noise is coming from the motor equalizer bar or stabilizer rod located at the right front side of the motor at the timing chain compartment. One end of this rod is attached to the frame and the other end contacts an arm located inside the timing chain compartment and extending up to the camshaft. The lower end of this arm pivots on a bushing and the upper end is finished with a roller which works off a clear cam on the camshaft immediately in back of the camshaft sprocket gear. The purpose of this rod is to stabilize or control the torque action of the motor to prevent excessive vibration.

In attempting to locate this trouble I would start first with the bolt and friction washers attaching this stabilizer bar to the frame bracket. The washers on the end of the bar are friction washers and should be in good condition and tight. The spring on the bolt should be compressed the full distance and then the nut backed off one complete turn. This will give the proper spring tension for the stabilizer bar at this end. The next point to check is the spring on the other end of the bar to see that it is not broken. There have been cases of these springs breaking, which relieves the tension on the rocker bar that operates off the camshaft and results in a knock. Then, I would look at the pivot end of the rocker bar to see that no wear exists at this point. Then, the roller on the other end of the rocker bar should be examined for nicks or for wear and replaced if there is any indication of trouble at this point. The square cam on the camshaft would come in for attention next to be examined for wear or friction, as this must be a smooth surface. It will be necessary for you to remove the timing chain cover in order to make the examination as outlined above with the exception of the stabilizer bar at the frame end.

HERE'S ONE ON US

IT seems we slipped up some months ago in advising one of our subscribers as to the cause of a buzzing noise in a Ball and Ball carburetor on a Plymouth. That issue was hardly in the mails before letters started coming in telling us just what the trouble was. Furthermore one of the readers pointed out that we had the correct information in the Chilton Flat Rate manual. Guess I'll have to buy the drinks on that one. Many thanks for the help. Here is a list of those who came to our assistance. W. K. T.

P. S. The proper correction consists of installing two gaskets, parts No. 20-37, on top of the step-up piston.

Chrysler Corporation, Detroit, Mich.

Tady Shimizu, Santa Monica, Cal.

Leslie Alter, Lewistown, Mont.

Clyde Patten, Boston, Mass.

H. W. Brasted, Elmira, N. Y.

W. E. Marsden, Stockton, Cal.

F. W. Lackard, Morrisville, Vt.

Cities Service Oil Co., Anderson, Ind.

C. R. Tate, Jackson, Tenn.

J. V. Hagaman, Toms River, N. J.

L. L. Cowling, Fairfield, Ill.

A. E. Wall, Binghamton, N. Y.

L. Garrett, Melrose, Mass.

Arthur Kainz, Gloversville, N. Y.

Albert Murphy, Vandalia, Ill.

SETTLING A PISTON INSTALLATION QUERY

We are taking the liberty to call on you in order to settle a difference in opinion regarding the following:

A friend of ours who owns a 1933, 1928 La Salle, now using cast iron pistons, as delivered, claims that if these pistons were replaced by aluminum pistons it would tend to throw the motor out of balance.

Also, a few lines regarding the advantage gained by installing aluminum pistons in this type motor would be greatly appreciated.—Berdoulay & Son, Sawmill River Road, Briarcliff Manor, New York, N. Y.

YOUR friend is quite right when he says that the installation of aluminum pistons in a 1928 La Salle would result in vibration. Piston weights can be changed in an 8 in line, a 6 in line or a 4 in line engine without affecting the balance. But, when it comes to a V-type engine, it is necessary to install the same weight pistons as those supplied originally by the manufacturer.

Of course, the generally named advantages for aluminum pistons are reduced reciprocating weights which, in turn, result in increased engine speed and, in addition, the higher heat conductivity will permit a higher compression ratio and also cooler running engine.

LIGHTS FLARE UP WITH ENGINE SPEED

Could you kindly advise me on the trouble I am having on a few cars lately with the lights flaring up when you race the motor. One Chevrolet 1929, I've changed generators, batteries, cables, tightened all connections and still get it. I also get a spark from the exhaust manifold rear nut to the dash. On a 1933 Chevrolet the same trouble exists. I am also having the same trouble with a 1929 Dodge with the lights flaring up. Any information would be appreciated.—A New Jersey Subscriber.

YOU probably have a loose connection in the circuit from the generator to the battery and the following connections should be carefully checked. See that ammeter terminals are tight. Remove battery terminals and scrape outside of battery posts and inside of battery terminals and coat the surface with petroleum jelly. Pay particular attention to the battery ground strap. See that it is in good condition and that the terminals are clean and tight.

We believe that the spark you are getting from the rear of the exhaust manifold to the dash is caused by a poor engine ground connection and we suggest that you check this ground strap, replacing it if it is not in good condition or if the terminals cannot be made clean and tight.

How Do You Locate an Engine Miss?

Motor Age Will Pay Cash Prizes For the Best Answers to This Contest Question! Join the "Money-of-the-Month" Club. You May Win!

Here is a question right down your alley. A simple, everyday problem—"How Do You Locate An Engine Miss?"—That question can easily be answered by the average automotive serviceman! And, for the best answers, written and submitted to the Contest Editor of MOTOR AGE, cash prizes will be awarded.

We want you to join in the fun and try for one of these monthly prizes. All you have to do to make yourself eligible for a prize is to read the rules printed on this page, and write a letter on the following subject: "How Do You Locate An Engine Miss?"

Last month, MOTOR AGE opened this series of "Money-of-the-

Month" Cash Prize Contests. Lots of fellows took a crack at the December question. The response was gratifying and letters are now being judged. Winners of the December contest will be announced in the February issue of MOTOR AGE.

But there's still plenty of room for those who didn't enter last month's contest. This month offers another big opportunity to win. The question asked is easy to answer.

Check over the contest rules, then write a short, clear-cut, factual statement telling us your method of locating an engine miss. Write 250 words, or more. Neatness and accuracy are important but contestants will be judged chiefly on what their letters say.

Contest Rules

1. Read these contest rules carefully.
2. Write a statement or letter . . . 250 words or more in length . . . telling how you locate an engine miss. Be sure that your name and address are printed clearly on each sheet of paper used.
3. Mail your letter to the Contest Editor, Motor Age, Chestnut Street at Fifty-sixth, Philadelphia, Pa., so that it will be postmarked not later than Feb. 10, 1936.
4. The Editors of MOTOR AGE are

the judges, and their decision is final. In the event of a tie, duplicate awards will be made.

5. The contest is open to all subscribers of MOTOR AGE. No entries mailed after closing date will be eligible. Winners will be announced in a future issue of MOTOR AGE. Employees of the Chilton Company and their families are not eligible to enter this contest.

6. Entrants in the contest thereby permit the use of their letters or statements signed with their names and addresses in MOTOR AGE.



Prizes

For the Best Letter

\$15.00 Cash

For the Second Best Letter

\$10.00 Cash

\$5.00 will be paid for every other contest letter which is published in MOTOR AGE.

Broadcasting for Business

Parkway Motor Company, Washington, D. C., goes after the wrecking business, using humorous "spot" announcements over the radio.

If it is raining outside, the talk is about skidding—so the announcer speaks:

"Do you get a thrill out of skidding? Well, go right ahead . . . have a good time . . . Just remember, when the skid ends in a knot around some telephone pole, that the best one to untangle you is West 0161 . . . Parkway Motor Company. . ."

The daily newspaper shows a picture of a wreck. The accompanying story tells a lurid tale. Here comes the spot announcement as a tie-up, viz.:

"Now you can afford a wreck! Climb up any telegraph pole you wish. Wrap yourself around your favorite tree. Anything, so long as you immediately call West 0161 . . . 24-hour towing service . . . West 0161 . . . Parkway Motor Company . . . one of the largest and finest equipped overhauling centers in the U. S. . . highly skilled mechanics . . . thorough overhauling for all makes of cars done right on the premises. . ."

8 Ways To Increase

A Telephone Drive Month

Plan: Entire month designated as "Telephone Month," for the telephone solicitation of business and the revival of dead accounts. Each member of organization given names of cash customers who have not been in lately.

Purpose: To stimulate the entire force in a program of telephone selling; to put the telephone to work.

Prizes: Cash awards given to employees chalking up largest amount of old business revived, largest *number* of sales made over the telephone (credit is given if the sale **ORIGINATED** over the telephone).

Safety Campaign

Plan: Windows, drive-in, and service floor bannered with streamers lettered with the one word "Safety."

Purpose: The special displays are backed with an employees' sales meeting to show that everything the service station has to sell is tied up with safety—safe driving. A Safety Campaign with the men

Extra Dollars Come Easier Purpose—and a Prize



"I believe in the Safety Campaign"



"We're using a Telephone Drive"

selling safety rather than sales and service, and customers *buying safety*.

Dime Plan

Plan: To select a "drive item" for **ONE DAY ONLY**, and to offer a small cash p.m. upon the sale of the article, paid out immediately by the bookkeeper upon presentation of the sales check.

Purpose: To induce the salesmen to get behind a specific, seasonal accessory or service, and to put an element of fun into it by giving the small cash p.m.—not less than 10-cents per item and not over 25-cents. (Particularly good to use during the winter months.)

Service Sales—

When You Have a Plan—a to Offer Your Men



"That Dime Plan is a Good Idea"

Home Selling Encouraged

Plan: To present a pair of theatre tickets on a movie house for every sale made outside, on off-hours.

Purpose: To bring the wife into the picture, as well as to encourage the employee to do outside selling. The wife is often able to uncover real business leads—she notices that Mr. Neighbor has starter trouble on cold mornings. The neighbor needs new spark plugs—and her mechanic husband sells 'em. When she pays her bill at the grocery, she reminds Mr. Grocer that her husband is in the maintenance business and will take care of his tire needs.

Supervisory Selling System

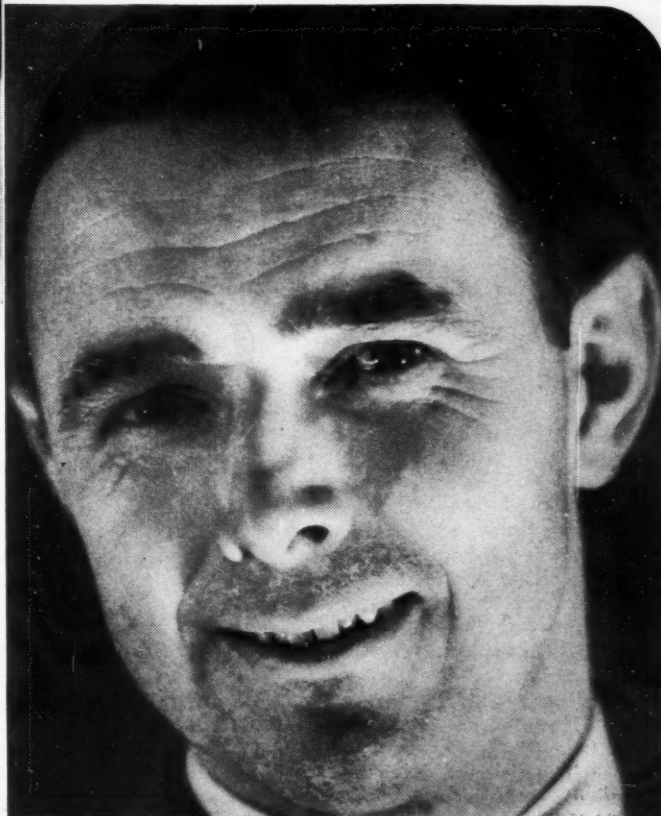
Plan: To have one of the men designated as a "sales supervisor" for every accessory line handled by the firm. This is applicable for large or small maintenance shops for in a small organization, one man may have a number of accessories under his wing.

Purpose: To make the selling job bigger and more interesting at the same time in every line, someone besides the boss is vitally interested to promote sales. A 2 per cent p.m. on ALL SALES made in his division provides this extra incentive to push a line which means far more to the boss than dipping into his profits for supervisory commissions.

Reward for Selling Quality

Plan: A point valuation is established for every quality service or quality accessory in the shop. For example, in the carburetor line, the higher grade equipment sells for \$16.50 and up, altogether to meet low-price competition there is a number selling at just \$5.95. When an employee makes a \$5.95

Continued on page 77



"We use the Sales Supervisor System"



Racing Champs of 1935

Kelly Petillo who led the field at Indianapolis captured national racing honors for 1935. He is shown on the extreme right. Other sectional champions are, from left to right, "Babe" Stapp, midwestern; Rex Mays, Pacific Coast; "Doc" MacKenzie, eastern.

Kelly Petillo Wins National Speed Laurels

Kelly Petillo, Huntingdon Park, Calif., driver, copped the National Automobile Racing Championship and is ranked No. 1 by the contest board of the American Automobile Association. Kelly won the International 500-Mile Sweepstakes on the historic Indianapolis Motor Speedway last Memorial Day.

Holding territorial laurels in the three sectional championships recognized by the board are:

Eastern States— George "Doc" MacKenzie, of Eddington, Pa.; Mid-Western States— Elbert "Babe" Stapp, of Los Angeles, Cal.; Rex Mays, of Riverside, Cal., tops the Pacific Coast circuit.

As king of the speed realm, Petillo will receive a diamond-studded gold medal from the Contest Board of the A.A.A., and similar medals will go to Cummings, who finished second in the standing, and Wilbur Shaw, credited with third honors. The awards likely will be made at Indianapolis prior to the start of the 1936 International Sweepstakes.

The Championships are decided upon points credited to the drivers according to their finishing positions. The National Championship draws points only in events of 100 miles or more in which the drivers are accompanied by riding mechanics in the big-two-man cars. The sectional Championships are decided upon points awarded in other racing pro-

grams within a given territory.

Few important changes occurred in the National Championship during the season except that Bill Cummings (Continued on page 40)



A REPORT from one of the automotive plants in Lansing, Mich., last month showed how a beautiful woman can almost wreck an assembly line.

The sweet, young, shapely thing, whose name was not disclosed, came late for work, took a short cut to her office through the assembly department.

One workman turned his head and caught a finger in a gear; another bumped against a piece of hot metal and another fell and sprained an ankle.

An accident report filed with the workmen's compensation board fixed the cost of the damage at \$150.

Oh well. Nothing ever happens in our editorial offices.

Employers Have a Duty to Employees

What is the responsibility of employer to employee?

Speaking on the subject to members of the Associated Business Papers, Inc., S. Wells Utley, president of the Detroit Steel Casting Co., and past president of the Michigan Manufacturers Association, said:

"The supreme question confronting the American people, transcending in importance all other questions combined, is whether they will continue to cherish and defend the principles which have been the mainspring of our progress, or whether they will abandon them for those under which man stood still for thousands of years. I am not fearful of the verdict of the American people provided they know the truth, provided they realize that those who live by the bounty of government are not citizens but subjects; that a "kept" man cannot be a free man; that the man who gets his income from government, whether it be through wages, bonuses, doles or government contracts, has lost both his right and his ability to criticize and oppose the government from which he gets his living. I am fearful lest, bewildered by meaningless promises, confused by the glittering balls being tossed into the air, they fail to realize the insidious nature of the things they are doing, and fail to recognize the ultimate end of the road they are traveling.

"What then is our responsibility to our employees in this critical situation? If we honestly believe that

American principles as exemplified in the American system have given to the employee a greater opportunity for advancement, a greater opportunity for happiness, a larger share in the wealth produced by his hands, than the principles which have operated in any other social system, then most assuredly we have a responsibility to help him to protect those principles for himself and his children. We as management have advantages which he cannot enjoy; we possess sources of information which he cannot have. We meet in great assemblages, where we bring together the best of our economic minds, the best of our monetary minds, the best of our legal minds, together with men skilled in all lines of business. It is our responsibility to make available to him, in language which he can understand, the lessons and the information we are privileged to gather.

"In this present crisis, we have a tremendous responsibility for leadership to these men. Will we accept it or will we shirk it? Oh, I know if you put a notice on the bulletin board telling employees they must do this or that, they must vote for some certain man, you'll not get a satisfactory reaction. As a matter of fact, you'll get exactly the same reaction from them that you yourself have when someone orders you about. But if you devote a small part of the thought, the tact, the psychology to selling these men on your leadership, that you do to selling some prospective customers on the quality of your product, you will find that these employees will follow you into the very jaws of hell, and if you don't do this, in the not-distant future, you will find yourself, with them, in the very bottom of hell, with no road left for retreat."

The Ford Motor Co., through its Chester, Pa., branch, announced the opening of a permanent truck and commercial exhibit at Broad and Lehigh Avenue, Philadelphia, last month.

1937 New York Show Will Open Armistice Day

So successful has been the motor industry's plan to stabilize employment by introducing new models in the fall, developing a new selling period, a more balanced production, and a better level of employment, that the Automobile Manufacturers Association this week announced blize employment by introducing Wednesday, Nov. 11, as the opening date of the next National Automobile Show at Grand Central Palace, New York, for first showing of 1937 models. The show will open on Armistice Day, which is more than a week following the national election, and will close on the 18th, thus providing three days for shipments of show exhibits to some of the dealer exhibitions that are expected to follow the national presentation.

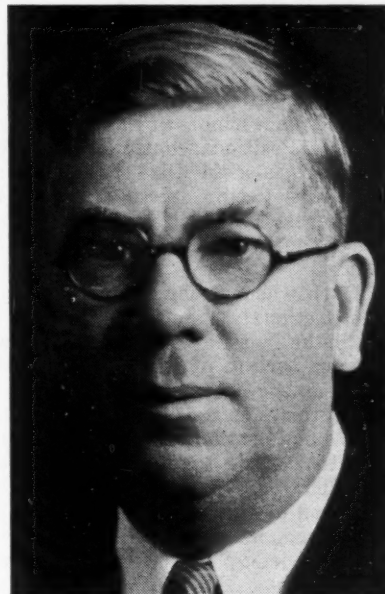
Discount Study Planned For R. I. Repairmen

The Master Automobile Repair Association, of Providence, R. I., in cooperation with local dealers and the jobbers has organized a discount committee to go into the question of discounts and determine, among other things, who is entitled to discounts.

The members of this committee from the Master Automobile Repair Association are Frank E. Domina, president of the association and George D. Hall, its secretary.

From the Automobile Dealers Association, J. F. Timothy and Eugene J. Brady. The jobbers are represented by Charles Davis and George Mellor.

Serviceman Elected Mayor of Holyoke, Mass.



Mayor Yoerg of Holyoke, Mass.

William P. Yoerg, for 26 years in the automotive business as tire dealer, operator of a tire service station, and dealer in batteries and brake linings, at Holyoke, Mass., was elected Mayor of that city Dec. 3.

He won the election by about 1200 majority over the Mayor, Henry J. Toepfert, who defeated him the year before.

Mr. Yoerg was supported by a strong organization drawn from both parties. He is pledged to make reforms in the welfare and other departments.

In maintenance business "Bill" Yoerg has distinguished himself as a champion of the independent servicemen.



THAT'S WHY MECHANICS WERE BORN. Throw out the tow line for winter blizzards are here. This is a typical picture of the service performed by maintenance men all over the country. This picture was taken when the first blizzard hit the high Sierras near Truckee, Calif., last month.

Kelly Petillo Wins National Speed Title

(Continued from page 38)

passed Wilbur Shaw to take the runner-up position after Shaw had won second place honors in the Indianapolis "500." Positions continually changed further back in the ranks but not once was Petillo driven from the top rung post to which he was assigned when he was victorious at Indianapolis.

Such was not the case, however, in the sectional Championships for not until the last races of the season was anyone certain of who would definitely wear the crowns.

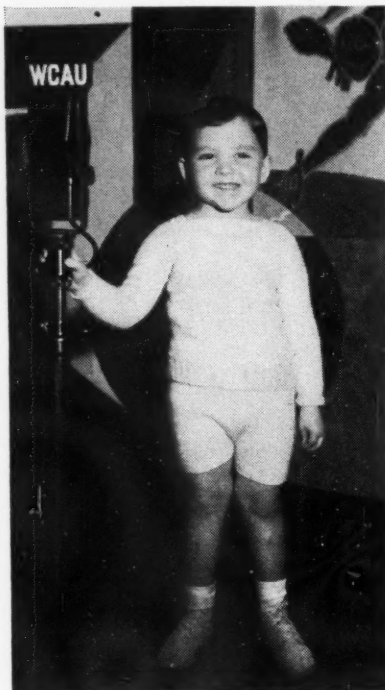
In the Eastern States Championship not less than six front line drivers took their turn on the top position but once "Doc" MacKenzie took the lead at the final stages of the circuit race, he was not again headed. The runner-up in the Eastern States title rating, Bob Sall, was Eastern Champion in 1933. Other top-flight drivers in the Eastern Loop are: Vernon Orenduff, John Duncan, Ken Fowler, Ben Shaw, Chet Gardner, Charles Tabor, Ed Staneck and Len Perry.

In the Mid-West, Chet Gardner, of Indianapolis fame, was for a time conceded as likely winner of honors there, but when Gardner forsook Western competition for an Eastern campaign, "Babe" Stapp gathered sufficient points to place Gardner in runner-up post. Following the leaders in the Mid-Western rankings are: Maynard Clark, "Doc" MacKenzie, Ken Fowler, Emil Andres, Billy DeVore, George Barringer, Vernon Orenduff and Kelly Petillo.

While it was reported that Rex Mays is credited with leadership in the Western Section, final lists are not as yet available. The 10 ranking drivers on the Pacific Coast circuit were, as of December 3, Rex Mays, Kelly Petillo, Al Gordon, Frank Wearne, Ray Pixley, Hal Cole, George Connors, Frank McGurk, Chris Vest and Chet Gardner.

The history of automobile racing lists Champions back as far as 1909 and the Sectional titles were created in 1932.

Sings for His Dad



Jerry Donohue, an outstanding radio performer at the age of three, singing regularly over WCAU in Philadelphia, is the son of Jerry Donohue, service manager of Blake Motors, Ardmore, Penna.

Acme Offers Pro-Flex for Body Touch-Up Jobs

The Acme White Lead & Color Works of Detroit has developed Pro-Flex for patching and spot repairing of factory synthetic finishes as used on the new cars. It is said to possess the durability and good patching qualities of lacquer as well as the natural gloss of baked synthetic enamel. It dries quickly.

This company is also marketing Fleet-X enamel for touching up scratches, worn spots and mars on Ford cars. Any color used on 1935-36 cars may be obtained in a convenient brush-top can. The retail price is 60c. a can.

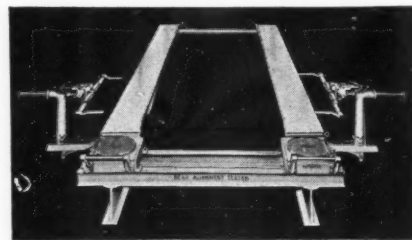
"\$25-a-Month" Finance Plan Launched by Ford

A new "\$25-a-month" plan for financing retail purchases of new Ford V-8 cars throughout the United States, was announced by Edsel Ford, president of the Ford Motor Co., last month.

The plan is to be offered through Ford dealers by the Universal Credit Co.

It has three important features: 1—Maximum monthly payments of \$25, plus the usual down-payment. 2—Finance charges at the rate of one-half of one per cent per month (6 per cent for 12 months) computed upon the total of the original unpaid balance plus insurance cost. 3—Insurance protection at regular conference rates, including not only fire and theft coverage, but also \$50 deductible collision insurance protection against other accidental physical damage to the car.

Bear's New Wheel Alignment Tester Has Two Test Units



The new Bear wheel alignment tester makes it possible to check caster, camber, king pin inclination, toe-in, etc. It is comprised of two testing units upon which the front wheels of a car are driven, for checking the relation of its wheel angles and steering geometry. Free floating and rotating turning gages measure the angle of left and right turns. A combination of auxiliary automatic gaging instruments, with visual indicator dials, are employed for checking the caster, camber, etc. This equipment is a product of the Bear Manufacturing Co., Rock Island, Ill.

Top Fifteen Drivers in the 1935 National Automobile Racing Championship

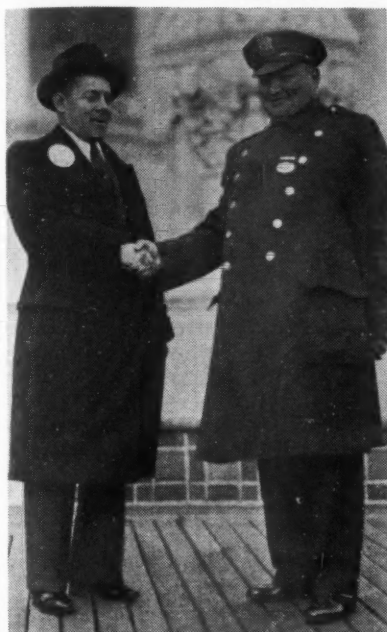
Place	Driver	Indianapolis, May 30	St. Paul, July 4	Springfield, Aug. 24	Syracuse, Sept. 2	Altoona, Sept. 7	Langhorne, Oct. 13	Total
1	Kelly Petillo.....	600(1)	120(1)	50(6)	...	...	120(1)	890
2	Bill Cummings....	400(3)	90(2)	...	90(2)	50(6)	...	630
3	Wilbur Shaw.....	450(2)	70(4)	...	...	30(8)	...	550
4	Floyd Roberts....	350(4)	...	...	...	80(3)	80(3)	510
5	Billy Winn.....	78½(6*)	...	120(1)	120(1)	...	90(2)	408½
6	Chet Gardner.....	200(7)	...	70(4)	...	...	...	270
7	"Shorty" Cantlon..	171¼(6)	...	...	50(6)	...	...	221¼
8	Lou Meyer.....	...	50(6)	...	30(8)	120(1)	...	200
9	Ralph Hepburn....	198(5)	...	...	...	...	...	198
10	"Doc" MacKenzie..	100(9)	...	...	70(4)	...	...	170
11	Al Miller.....	...	80(3)	...	80(3)	...	...	160
12	Frank Brisko.....	...	...	...	...	90(2)	70(4)	160
13	"Deacon" Litz....	32½(8)	60(5)	...	60(5)	...	...	152½
14	Gene Hausteine..	102(5*)	...	...	...	...	50(6)	152
15	George Barringer..	...	...	90(2)	...	...	60(5)	150

*Relief driver. () Place.

GM Winter Showings In 50 Cities Begin Feb. 1

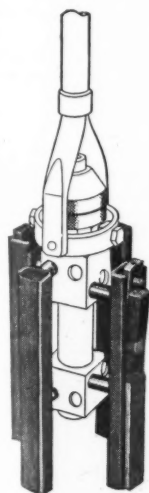
"Building prosperity with greater values" will be the slogan of General Motors, when it stages winter showings of its products in 50 cities throughout the country starting Feb. 1. These exhibits will replace the spring shows held in the past, the dates being advanced because of the earlier introduction of new models and in order that the stimulus to sales may be derived before normal expansion of the market in the spring.

Welcome to A. C.



This photo shows Rex Perry in the hands of the law at Atlantic City, during last month's Automotive Service Industries Show. Mr. Perry, who is Sales Manager of Hein-Werner Motor Parts Corp. of Waukesha, Wis., was safely and peacefully "in the hands of the law" we hasten to assure you.

Two New Sunnen Products Offered Maintenance Trade



The Sunnen Products Co., 7900 Manchester Avenue, St. Louis, Mo., announces a new roughing cutter to be used with the Sunnen wrist pin hole grinder. This cutter is for roughing out in aluminum or bronze and is said to be considerably faster than a reamer for this work. The final finish is secured with the roughing and finishing stones in the usual manner.

Another new Sunnen product is the ridge removing stone illustrated. This device is used in the Sunnen cylinder grinder driven by an electric drill. Wooden guides are used to locate the tool in the cylinder barrel, and the stones travel down at a slight angle, eliminating the possibility of marring the cylinder walls while grinding away the ridge at the top. For \$6 you get a complete set of ridge removing stones, guides and holders to fit the Sunnen cylinder grinder. One set of stones will remove ridges from 75 to 125 cylinders and a set of reloads is priced at \$1.50.

Bill Schindler Again Wins Midget Money at Kingston

Bill Schindler, speed demon from Schenectady, N. Y., won the main event, with George Krantz second and Pop Venth third, when indoor midget racing was opened at Kingston, Pa., last month.

The 20 machines that were entered were manned by experienced and daring drivers. There were no serious mishaps, despite the strangeness of the track and the loose dirt in the Armory oval. Rules governing the race were similar to those used in regular auto races and speedway classics.

The race summaries:

First heat — Pop Venth, first; George Krantz, Henry Gritzback.

Second heat—Bill Schindler, first; Bill Troutman, Henry Gritzback.

Third heat—Henry Gritzback, first; Bill Scarrince, Sam Greco.

First handicap — Harry Angeloni, first; Carl Smith, Ralph McLeore.

Second handicap — Bill Troutman, first; Bill Scarrince, Sam Greco.

Consolation — Red Mallow, first; Henry Angeloni, Walter Fusco.

Main event—Bill Schindler, first; George Krantz, second; Pop Venth, third; Bill Scarrince, fourth, and Henry Gritzback, fifth.

Officials—Harvey Tattersal, chief steward; Merion Katulka, track manager; Red Crise, starter; Power Boyle, chief scorer; E. I. Schwartz, pit manager; George C. Perkuke, supervisor of events.

The Motorist Pays and Pays and Pays

1934.....	\$32.46
1933.....	27.76
1932.....	24.00
1931.....	22.74
1930.....	21.00
1929.....	18.24
1928.....	16.86
1927.....	14.46
1926.....	12.66
1925.....	8.80
1924.....	5.46
1923.....	2.28
1922.....	1.20
1921.....	.54

The rise in taxes from 1921 to 1934 on 600 gal. of gasoline, which is the average amount used in a year's driving by the average motorist. And the more the car owner has to pay, the less there is for the independent shop operator.

Wonder Weld Seals Cracks in Cylinder Blocks

Wonder Weld is a metallic preparation, with other materials added, which is claimed to permanently seal any crack in a valve port, cylinder block or head. It is introduced into the cooling system when the water is warm, and sealing takes place when this solution comes in contact with the hot metal. It is a product of the Miller Mfg. Co., 1100 Mt. Ephraim Ave., Camden, N. J. The retail price is \$1.50 per pint.

Speed King Goes Cycling



Although he holds the world's automobile speed record Sir Malcolm Campbell is said to have a liking for more milder forms of transportation. His fondness for bicycling is indicated as he is shown with Lady Campbell, his son and daughter, Donald and Jean.

Rex Mays Wins Another



Virtually clinching the Pacific Coast sectional championship, Rex Mays, with his Japanese mechanic, Takio Heroshina, display triumphant smiles, after beating the starting field of nine nationally known drivers, to win a recent 200 lap auto race at Ascot Track, Los Angeles.

Ford Improves Hot Air Car Heater

Several improvements have recently been incorporated in the Ford heater, a product of Ford Motor Co., Detroit. A button control is now provided for installation on the instrument panel to regulate the amount of heat which comes out of the register, the latter having been redesigned to permit an unrestricted flow of heated air to



pass into the car. The metal tube formerly used to connect the heater to the register outlet has been replaced with a helical spring covered with woven asbestos cloth which is said to keep exhaust noises out of the car. The fresh air inlet has also been changed to increase the flow of air into the heater.

Did you read "Taking The Mystery Out of Diesel Servicing" by Bill To-boldt, on pages 20-21 of this issue?

Brakeblok Extends National Campaign

American Brakeblok's dealers and distributors are to have greater support in the way of national consumer advertising, according to an announcement just made by the company.

Each month for the last five years Brakeblok's advertising has appeared in the *Saturday Evening Post*, as a part of what is claimed to be the

greatest magazine advertising campaign in the history of the brake lining industry. Now, the company also will advertise regularly in *Collier's*.

Plans for the 1936 advertising call for a continuance of the popular American Brakeblok *safety appeal*, with emphasis on the necessity for regular inspection and servicing of brakes. Various types of displays and other trade helps will be used to link dealer and distributor with the consumer advertising.

New Champion Take-Up Spring Stops Rattles

The Champion drag link take-up spring for the 1935-36 Fords is designed to give additional tension to keep the ball seated in the socket, thereby stopping rattle, shimmy and



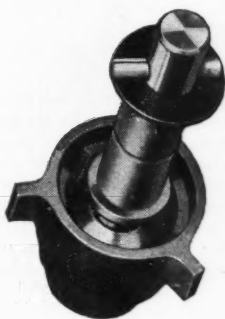
road weave. An oil resisting washer keeps the grease in and the dirt out. This device does not affect the steering, according to the Champion Anti-Rattler Co., Inc., 1935 Washington Ave., St. Louis, makers of the product. A set of four retails for \$0.50.

Must Have Been A Trained Jackass



Odom Battery and Tire Co. drove this rig through the highways and byways of Spartanburg, S. C. Every time the jackass refused to move, the driver climbed out, gazed over his specs at the slogan "When It's An Exide, You Start," and then climbed back. The jackass would then start with a flourish of his hind feet. Crowds enjoyed the show.

Simmons Develops Pack-less Repair Pump Unit



The Simmons one-piece pack-less repair unit for Ford V-8 water pumps utilizes the old pump housing. A Simmons water pump seal replaces the standard packing and is said to require no further adjustment. Its sealing surfaces are protected by a metal housing from abrasive, grit and dirt and are not affected by anti-freeze compounds according to The Simmons Mfg. Co. of Cleveland, Ohio, makers of this unit.

Kansas City Clinic

Planned for Mar. 25-27

Arrangements have been made to hold the 2nd Annual Midwest Automotive Trade Show in Kansas City's new \$6,000,000 Municipal Auditorium. The dates will be March 25-27.

Plans call for more than 200 exhibit spaces on the main floor of the Exhibit Hall of the Auditorium.

V. E. Mott, chairman of the Jobber Division of Automotive Trade Assoc., Jack LaGalle of the Kansas City Automobile Supply Co., and Ray Barnett A.T.A. executive-secretary are among those handling the clinic.

In cooperation with the Chamber of Commerce Convention Bureau the forthcoming show will be expanded to serve both the retail and wholesale trade in Kansas City's trade area.

Motor Age Helped Him Do The Job



Three of Motor Age's sales representatives cracked up their car en route from the recent Atlantic City A. S. I. Show. No one was seriously hurt, and luckily for them the accident occurred in front of Pete's Garage, Pennsville, N. J. Despite the fact that the car was damaged badly, Howard Peterson showed the demon salesmen that he was an efficient mechanic by fixing the car in jig time.

Barney Oldfield Hurt



Barney Oldfield, old-time auto racer, was reported to have suffered a scalp wound, in a slight mishap last month, when his automobile turned over after sideswiping a truck on a highway near Jefferson City, Mo.

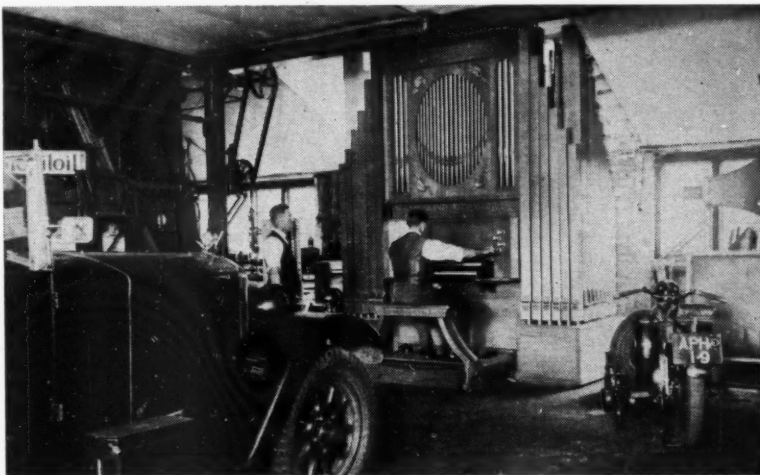
Pedrick Offers All-Steel

Shop Cabinet to Shops

One of the features of the 1936 Profit Plan as announced by the Wilkening Manufacturing Co., Philadelphia, producer of Pedrick piston rings, is a large all-steel shop cabinet 26 in. high, 15 in. wide and 9 in. deep. It is equipped with a padlock and can be mounted in the most convenient location on the shop wall.

This cabinet is one of a number of useful features given free to leading repair shops and dealer service stations who use Pedrick hydraulic piston rings. The cabinet has three shelves for storage of merchandise or tools. It is finished in three colors and incorporates a complete Guide to Motor Reconditioning on all passenger cars for the past seven years.

An English Mechanic's Idea of "Tune Up"



S' help me! Here's a picture of a London garageman who apparently believed he could help his tune-up business by installing a huge organ in his place. So he built one from odds and ends, doing the job in his spare time. A garageman by training, organ building is only a hobby.

Rumor Says Packard May Produce New Light Six

Reports say that Packard Motor Car Co. is considering the addition to its line of a Light Six. While official comment is not available, the trade would not be surprised to see Packard further extend its coverage of the passenger car market in line with the policy so successfully pursued when it brought out the 120. No definite decision is believed to have been made, however, and if the company should decide to enter the lower priced field, it is not considered likely, in view of the task involved, that the new car, assuming one is eventually to be brought out, will be ready before fall announcements next year.



THERE are many good reasons why people like to go South, go West, or go anywhere where it's warmer in the wintertime. The picture undoubtedly illustrates a number of good reasons for having the car tuned up and made ready for a winter vacation.

Automotive Association Elections at ASI Show

The N.S.P.A., the M.E.W.A. and the M.E.M.A., jobber and manufacturers' associations, conducted annual conventions in conjunction with the recent Automotive Service Industries' show in Atlantic City, and announced elections of new officers. A list of new association officers follows:

National Standard Parts Association: President, John P. Muller, Fort Worth jobber; Senior Vice-President, Leo F. Hunderup, Van Norman Machine Tool Co.; Junior Vice-president, V. C. Hosselman, jobber, Lima, Ohio. **New manufacturer directors:** F. A. Miller, U. S. Asbestos Division of Raybestos-Manhattan; H. A. Lightner, DeLuxe Products Corp.; A. C. Darling, Borg-Warner Service Parts Co.; L. F. Woolman, Allen Electric and Equipment Co.; Robert D. Black, Black & Decker Mfg. Co. **Jobber directors:** W. P. Nash, Visalia, Cal.; V. C. Anderson, Chicago; R. L. Terry, Sioux City; V. C. Hosselman, Lima, Ohio; C. E. Prefontaine, Montreal.

New Motor Equipment Wholesalers Association officers: President, W. F. Wilkerson, Casper, Wyo.; Vice-president, G. N. Lockridge, Kansas City; Treasurer, A. W. Kleinschmit, Detroit; Secretary, S. O. Treland, Chicago. **New directors:** R. C. Sparks, Champaign, Ill.; E. O. Hunting, Denver, Col.; G. W. Huston, Wichita, Kan.; G. E. Johnson, Roanoke, Va.; H. Miller, Dayton, Ohio.

New Motor Equipment Manufacturers Association directors: J. M. Spangler, National Carbon Co.; A. L. Smith, Pyrene Mfg. Co.; H. L. Sharlock, Bendix Aviation; W. P. Ferris, Blackhawk Mfg. Co.; F. S. Wacker, Automotive Maintenance Machinery Co.

Louisville Repairmen Must Report Cars in Accidents

Under a new traffic ordinance in Louisville, Ky., garagemen may not start repairs on any car before it is inspected by police, where such car appears to have figured in an accident. An operator of a repair shop was arrested recently after police had traced a hit-and-run car to his repair shop.

The man told the court that the damage was light and he had no idea that the car had been involved in an accident with another car, in that it came into his shop on its own power.

AS a means of cutting down automobile accidents, an oil company, operating a series of gasoline service stations in Denver, Col., announced a New Year's resolution: not to sell any gasoline to drunk drivers.



Violation of this company order, by station attendants, will be cause for immediate dismissal.

Circulation Improved On Hot Water Heaters

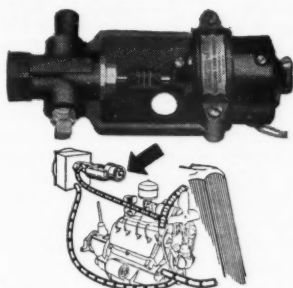
A Heater-Ade can be used with any make of hot water car heater, and by providing a forced circulation of the water is said to greatly increase the efficiency of the system. Designed for use on V-8 Fords, this device is mounted directly on the hot water inlet of the heater, and a hose connection is made to the engine water outlet, below the thermostat. As soon as this auxillary pump is turned on the water starts to circulate through the heater, it being claimed that heat is available within three minutes after starting the engine. A feature of the Heater-Ade is that on mild days the

School for Traffic Cops



The problem of handling the gigantic flow of motor traffic in New York City is aided by means of a traffic school where the subject is studied by means of miniature cars and trucks. Photo shows Lieutenant Meyer, New York traffic expert and teacher of the Traffic Squad.

electric motor can be turned off, and the circulation of water will continue through the heater in the normal way.



A product of the Elgin Machine Works, Inc., Elgin, Ill., the outfit retails for \$7.95.

When a Muffler Is a Silencer

That science is the hand-maiden of the humble silencer hidden beneath the car, as it is of the finest engine purring beneath the hood, becomes evident in the laboratories of the Walker Manufacturing Company, Racine, Wis. Here the "Silencer Comparator" makes the surprising revelation that a silencer and a mere muffler are very different things.

E. G. Gunn, chief research engineer of the Walker company, developed the comparator by which the effect of structural changes in silencers could be determined precisely.

The silencers to be compared are connected to a common exhaust manifold, with a two-way plug cock at the junction so that the exhaust gases can be directed through either silencer, after which they pass through a common tail pipe, at the end of which a microphone is mounted to pick up the sound. The microphone converts sound to electric impulses which pass to an amplifier, which in turn relays them to the oscillograph.

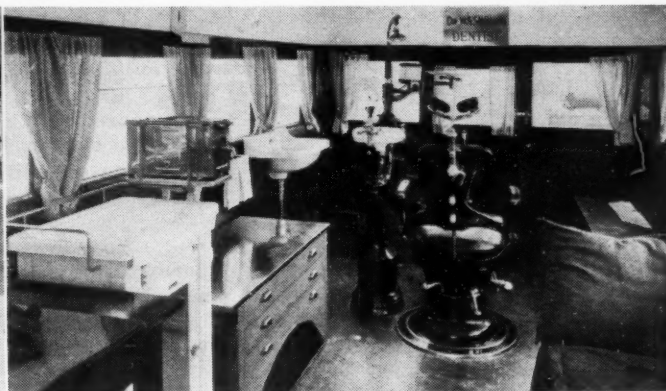
The louder the noise the more electronic discharge is deflected. This results in a wavy line of light on the screen, much like a stock market graph.



"Well—when are you going to start looking at my BRAKES?"

By switching the two-way cock to and fro, the value of two mufflers as silencers may be compared visually within a few seconds. Comparisons throughout the engine speed range take but a few minutes. When the test is completed the better of the two

mufflers becomes the standard of comparison, until some change is effected that yields a straighter line on the oscillograph. The instrument is so sensitive to slight differences that a mere tap on the table will show on the instrument.



THE Canadian Red Cross, in cooperation with the Provincial Department of Health, is bringing dental treatment to families in sparsely settled sections of Ontario where such services do not exist. The clinic, in charge of Dr. B. L. Washburn and his wife, who is a trained nurse, moves about the country in a motor coach equipped as a modern dental laboratory and surgery.

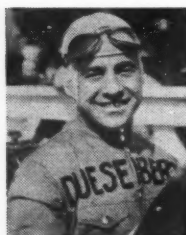
FACTORIES



Theron (Brad) Bradshaw

Division, Raybestos-Manhattan, Inc., makers of Grey-Rock Brake Linings and other Grey-Rock products, is now touring southeastern states. He reports all indications point to good business for his company and its products during the coming year

* * *



Peter De Paolo, internationally known automobile race driver, has joined Thompson Products, Inc. as a sales engineer and will tour the country during 1936 addressing main-

tenance trade audiences, according to an announcement by Tom O. Duggan, merchandising director of the parts manufacturing concern.

* * *

In a recent statement, Will Dammann, president of the Bear Manufacturing Co., said, "Due to the volume of our business, it has become again necessary for us to build an addition to our factory. . . . Property has been acquired and plans are already progressing to construct a modern structure across the street from our present plant. . . ."

* * *

Every employee of Sealed Power Corp., manufacturers of piston rings, pistons, pins and cylinder sleeves, received a bonus check of equal amount issued by the company shortly before Christmas.

* * *

Affiliation of the businesses of Thompson Products, Inc., and Toledo

The Perfect Circle Co. has announced the appointment of Theron (Brad) Bradshaw as Service Engineer. Mr. Bradshaw has been superintendent of transportation for the William Fox Movie Studios, served in the Motor Transportation Corps Overseas, took charge of transportation for the Southern California Edison Co., then set up The Piston Ring Shop in Los Angeles. Later he became manager of the shop department for Colyer Motor Sales Co.

* * *

American Brakeblok claims a mileage record in service on hydraulic brakes, with a conservatively estimated total of eleven billion miles as original equipment alone, a recent announcement stated.

In the last three years American Brakeblok has been used on more hydraulic brakes, it is stated, than all other brake linings combined. Much of this service has been on cars which were pioneers in equipping with hydraulics.

* * *

Franklin A. Miller, replacement sales manager for the United States Asbestos

Division, Raybestos-Manhattan, Inc., makers of Grey-Rock Brake Linings and other Grey-Rock products, is now touring southeastern states. He reports all indications point to good business for his company and its products during the coming year

* * *

Steel Products Co., has been announced by F. C. Crawford, president of the former company. The move is not an absorption of the Toledo plant, it is explained. It will continue to operate as an entity in manufacturing, sales and distribution under its own management.

* * *

F. E. Schluter, president of Thermoid Rubber Co., has made known the acquisition by his company of the Triplewear Brake Lining Corp. (formerly the Durwyllan Co.).

* * *

The Whitney Mfg. Co., makers of roller, silent, block and conveyor chains and sprockets, has changed its corporate name to the Whitney Chain & Mfg. Co., effective Jan. 1.

* * *

A feature of the annual Alemite sales convention in Chicago last month was the announcement of a greatly extended national advertising campaign.

* * *

James D. Dunlop, brake service engineer, has been appointed to the staff of the Asbestos Manufacturing Co. Mr. Dunlop was formerly associated with L. J. Miley Co.

* * *

W. W. Hoagland, chairman of the board of the Hayes Body Drop, was elected president of the American Auto Felt Corp. last month.

Financing Reserves Only Source of Dealer Profit

Operations of automobile dealers would show a net loss for their entire retail business were it not for finance reserve earned, according to a nationwide survey made by the National Automobile Dealers' Association. The figures, embodying the combined statements of 803 representative dealers for their 1934 operations, show that without this finance reserve, amounting to \$767,471, the net retail operations of these dealers would have shown a loss of \$69,528.

With the advent of the banks in automobile financing, and the general reduction of rates, dealers fear that the reserves they formerly earned will be materially reduced, and still further destroy their opportunity for profits.

The finance reserve results from a sum added to the finance charges under the recourse plan for the purpose of protecting the dealer against his contingent liability. The amount is determined by the finance companies on the basis of their experience. What is left of the finance reserve, after deduction of dealer losses from non-payment of drafts, repossessions, etc., then becomes net profit to the dealer. Under the non-recourse plan which is favored by banks and other institutions now entering the field at reduced rates, no finance reserve is set up for the dealer, and profits from this source are consequently eliminated.

The summary of the N.A.D.A. survey follows:

Total sales, all depts.	\$257,193,051
Cost of sales, all depts.	212,415,684
Gross profit	\$44,777,367
Total expenses	42,863,062
Operating profit	\$1,914,305
Other deductions, less other income	304,398
Net result	\$1,609,907
Less wholesale	911,964
Net result, retail operations	\$697,943

Hudson Tail Lights



When the driver steps out of a 1936 Hudson or Terraplane to remove a spare tire or get out some baggage, he is protected from rear-end collision by means of a warning signal contained in the tail light.

Preliminary Facts and Figures of the Automobile Industry in 1935

From the Automobile Manufacturers Association

Production and Value

	1935	1934
Cars and trucks produced in U. S. and Canada.....	4,150,000	2,869,963
Passenger cars	3,400,000	2,270,566
Motor trucks	750,000	599,397
Production, percentage increase over 1934.....	45%	44.5%
Production of closed cars.....	3,360,000	2,242,874
Per cent of closed cars.....	99%	99%
Wholesale value of cars.....	\$1,797,800,000	\$1,204,376,351
Wholesale value of trucks.....	\$388,700,000	\$332,913,985
Wholesale value of cars and trucks combined.....	\$2,186,500,000	\$1,537,290,336
Average factory price of cars.....	\$705	\$662
Average factory price of trucks.....	\$691	\$696
Number of tires shipped	50,000,000	46,600,000
Wholesale value of parts and accessories for replacements, and service equipment	\$565,000,000	\$514,000,000
Wholesale value of rubber tires for replacement.....	\$248,000,000	\$238,497,000
Motor vehicles, accessories, service equipment and replacements of parts and tires.....	\$2,999,500,000	\$2,289,787,336
Gasoline consumption by motor vehicles, retail value including taxes	\$3,260,000,000	.....

Registration

Motor vehicles registered in U. S.....	26,000,000	24,933,403
Motor cars	22,450,000	21,524,068
Motor trucks	3,550,000	3,409,335
World registration of motor vehicles	36,500,000	35,087,698
Per cent of world's automobiles in U. S.....	71%	71%
Passenger cars on farms.....	4,134,675	4,134,675
Motor trucks on farms.....	900,385	900,385
Motor vehicles on farms	5,035,060	.....

Taxes

Total motor vehicle user taxes.....	\$1,288,000,000	1,200,107,729
Gasoline taxes, federal, state and municipal.....	\$804,500,000	.....
Percentage motor user taxes to all taxes from all sources, federal, state and local.....	13%	.....

Automobile's Relation to Other Business

Automotive industry is the largest purchaser of gasoline, rubber, steel, malleable iron, mohair, upholstery leather, lubricating oil, plate glass, nickel and lead. Number of carloads of automotive freight shipped over

railroads	3,422,000	3,064,800
Rubber used by automobile industry	75%	75%
Plate glass used by automobile industry	77%	70%
Steel and iron used by automobile industry.....	23%	23%
Lumber, hardwood, used by automobile industry.....	8%	8%
Copper used by automobile industry.....	22%	18%
Lead used by automobile industry.....	39%	38.8%
Zinc used by automobile industry.....	15%	12.2%
Tin used by automobile industry.....	20%	13.3%
Aluminum used by automobile industry.....	16%	15%
Nickel used by automobile industry	33%	29.6%
Gasoline consumption by motor industry.....	89%	89%
Gasoline used by motor vehicles (gallons).....	16,150,000,000	15,300,000,000
Lubricants used by motor vehicles (gallons).....	485,000,000	.....
Lubricants, per cent used by motor vehicles.....	59%	.....
Crude rubber used by motor industry (lbs.).....	885,000,000	718,000,000
Cotton fabric used in tires (lbs.).....	210,000,000	202,000,000

Motor Trucks

Motor trucks in use	3,550,000	3,409,335
Number of trucks owned by farmers (25% of all trucks).....	900,385	900,385
Fleets of more than 5 trucks, number of operators.....	28,035	25,975
Number of trucks operated in fleets.....	780,000	771,941
Total motor truck taxes	\$314,000,000	\$308,828,000
Trucks represent 13½% of all motor vehicles, and pay 24% of all motor taxes.....	13½% and pay 26.7% taxes	.....
Number of truck drivers.....	2,500,000	.....
Communities served exclusively by trucks.....	48,000	.....

Motor Buses

Motor buses owned	116,500	113,130
Number of buses in revenue service.....	45,000	43,000
Number of buses in local or transit service.....	18,380	17,580
Consolidated schools using motor transportation.....	23,650	23,580
Buses used by consolidated schools	70,500	70,130
Buses used by street railways	12,600	11,570
Street railways using motor buses.....	190	199
Companies in city service including street railways.....	825	.....
Steam railroads using motor buses.....	65	71

Foreign Sales

Number of American motor vehicles sold outside U. S... (U. S. exports and output in U. S. owned Canadian plants).....	565,000	427,374
Per cent increase in foreign sales over 1934.....	32%	.....
Per cent of production sold outside U. S.....	13.6%	14.9%
Value of motor vehicles, parts and tires exported from U. S. and Canada	\$239,000,000	\$214,291,313

Motor Vehicle Retail Business in U. S.

Total car and truck dealers	39,400	37,238
Total repair shops	98,169	99,538
Total retail outlets, duplications eliminated.....	105,330	105,991
Wholesalers	5,932	5,757
Retail gasoline outlets	320,000	.....

Ride 'Er Cowboy



Joe Petralli, national motorcycle champion, set a new world record as he crossed the tape in 11.51 seconds after a breakneck climb up steep Castle Creek Hill, at Hornell, N. Y., distance 425 yards. His new mark was in the 45 cubic inch expert class.

Estimates Accessory Sales

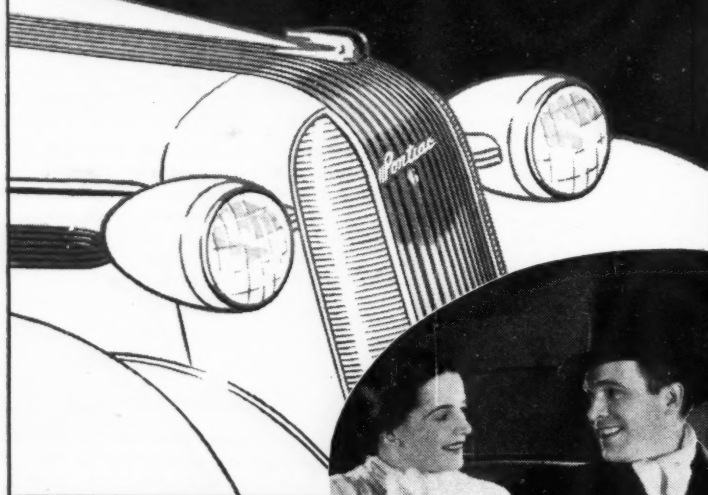
More automobile accessories by far have been bought by motorists in the last three months than during any similar period in the history of the motor car business, says O. A. Lamoreux, parts and accessories manager of Pontiac Motor Co. "It is said on good authority," continues Mr. Lamoreux, "that the automotive accessories volume for the country is running at the rate of between \$150,000,000 and \$200,000,000 a year."



"I can get the tone, but I can't get the volume"

Every Feature A CAR TO SCORE A GREAT

DISTINCTIVE BEAUTY—Pontiac's famous Silver Streak is the one new and different note in styling again in 1936—the year's best answer to the universal desire for greater beauty and distinction in the low-price field.



UNSURPASSED ECONOMY

Pontiac meets the demand for economy with a car that is big, yet is far and away the most economical in its class as dealers prove by competitive tests.

AMPLE ROOM... ADEQUATE WEIGHT

A Pontiac demonstration usually means a Pontiac sale and here are two reasons: Adequate weight gives that essential feeling of steadiness. Ample room and level floors front and rear keep every passenger comfortable and content.



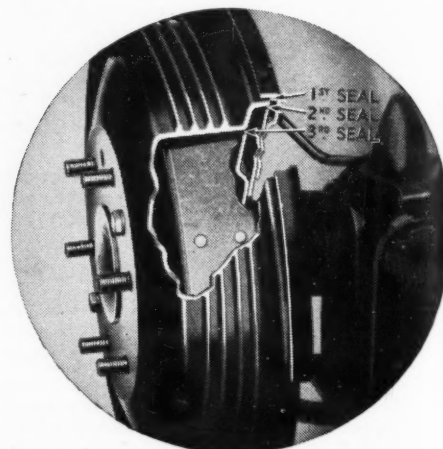
SUPER-SAFETY UNDER ALL CONDITIONS

Pontiac meets today's interest in safe transportation with the longest list of safety features in the low-price field—everything from safety glass* all-around to the sturdiest frame built today.

*Slight extra cost in Master Six.

TRIPLE-SEALED BRAKES

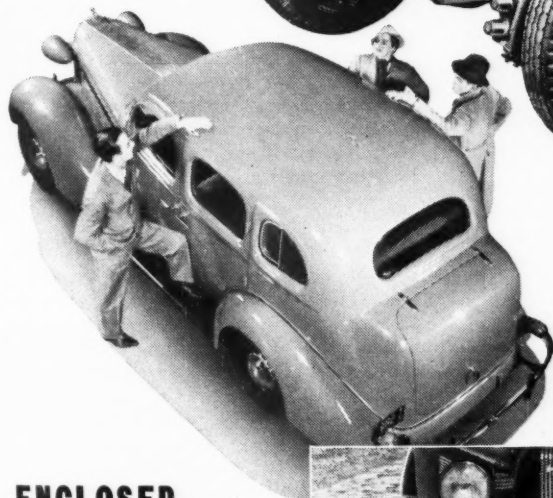
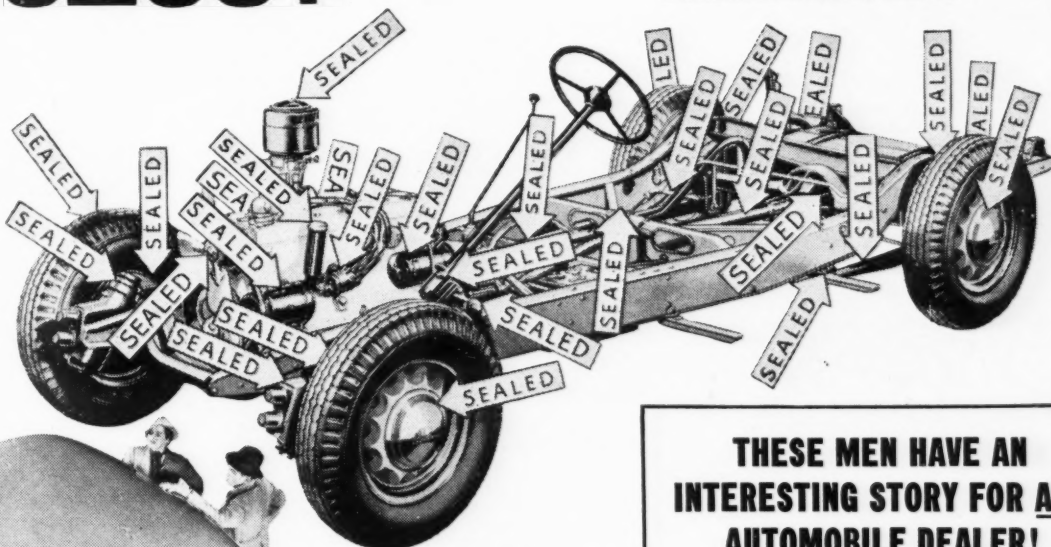
Pontiac provides the priceless selling feature of the finest, safest and smoothest brakes money can buy—big hydraulics, triple-sealed against dirt, slush, snow and water and with warp-proof drums of iron fused on steel.



MUST HAVE SUCCESS!

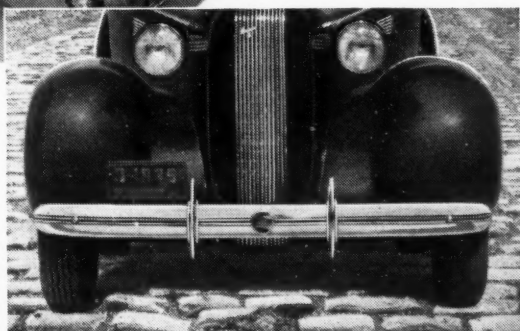
COMPLETELY SEALED CHASSIS

This sturdy chassis, sealed at every vital point against dirt and water, proves that Pontiac construction assures unsurpassed dependability.



SOLID STEEL "TURRET-TOP" BODY

This advancement is probably the most advertised and most desired automobile feature of the day. Pontiac's big Fisher Bodies also provide No-Draft Ventilation.



ENCLOSED KNEE-ACTION

When the public thinks of smooth riding today they immediately think of Knee-Action. Pontiac enclosed Knee-Action, on the De Luxe Six and Eight, also makes sales of demonstrations by improving handling ease.

WITH two lines of sixes, a line of eights, and 21 separate models . . . with features that include all that the public has been taught to demand . . . with list prices ranging from \$615 to \$855, and hence well down in the low-price field in which over 90 per cent of all cars are sold . . . Pontiac dealers are well on their way toward excelling their record for 1935 when they *doubled* sales over the previous year. And bear in mind that in the Pontiac dealer organization, profits keep pace with sales, because the Pontiac dealer discounts on cars and accessories rank with the very highest in the industry.

PONTIAC MOTOR COMPANY, PONTIAC, MICHIGAN
Division of General Motors

THESE MEN HAVE AN INTERESTING STORY FOR ANY AUTOMOBILE DEALER!

If interested, get in touch with the nearest Pontiac Zone Manager listed below.

LOCATION	ADDRESS	ZONE MGR.
Atlanta, Ga.	494 Spring St. N.W.	J. T. Bray
Boston, Mass.	1050 Park Sq. Bldg., St. James Ave.	C. N. Kane
Buffalo, N. Y.	1100 Main Street	J. A. Grier
Charlotte, N. C.	500 W. Trade St.	R. H. Fussell
Chicago, Ill.	21st & Calumet	W. J. Mougey
Cincinnati, Ohio	Broadway & 7th Sts.	D. M. House
Cleveland, Ohio	1900 E. 24th St.	A. A. Martin
Dallas, Texas	2001 McKinney Ave.	O. T. Miller
Denver, Colo.	601 Continental Oil Bldg.	S. C. Bray
Detroit, Mich.	15th. Fl. G.M. Bldg.	V. A. Davidson
Des Moines, Iowa	Des Moines Bldg., 6th Ave. & Locust St.	L. A. Fleener
Kansas City, Mo.	Admiral & MaGee Sts.	C. W. Mellen
Los Angeles, Calif.	2222 S. Figueroa St.	C. G. Riley
Memphis, Tenn.	320 Dermon Bldg.	W. J. Connors
Milwaukee, Wis.	600 W. Wisconsin Ave. Mariner Tower Bldg.	J. M. Taylor Jr.
Minneapolis, Minn.	801 Washington Ave.	N. L. H. Kurtz
New York, N. Y.	561 W. 55th St.	M. C. Thompson
Oakland, Calif.	1375 E. 8th St.	A. M. Sanders
Oklahoma City, Okla.	10th & Broadway	R. W. Losey
Philadelphia, Pa.	401 N. Broad St.	G. B. Albrecht
Pittsburgh, Pa.	Baum Blvd. & Craig St.	A. R. Shedd
Pontiac, Mich.	196 Oakland Ave.	A. C. Tiedemann Jr.
Portland, Ore.	13th & Burnside Sts.	L. W. Ward
St. Louis, Mo.	3900 W. Pine Blvd.	W. P. Winslow
Washington, D. C.	5th Fl. Transportation Bldg. 17th & H Sts. N. W.	H. H. Grothjan

PONTIAC SIXES AND EIGHTS \$615

List prices at Pontiac, Michigan, begin at \$615 for the Six and \$730 for the Eight (subject to change without notice). Safety plate glass standard on De Luxe Six and Eight. Standard group of accessories extra. A General Motors Value.

Compare Pontiac's value and new low prices on the greatly reduced G.M.A.C.'s 6% plan—the lowest cost to time buyers ever offered by Pontiac dealers

Intake and Exhaust



SEEKING a negro on a charge of stealing an automobile last month, Deputy Sheriff Roy Carver turned loose the bloodhounds.

With a wild whoop the hounds went off on a trail of the alleged thief but—when the sheriff finally caught the man, he found that one of his bloodhounds, named Sherlock Holmes, Jr., was being used by the fugitive to hunt rabbits.

"Ode to An Old Clunk"

She's standing in the used car lot,
A bunch of rattles, thumps and knocks,
And every day the salesman comes
And stands besides her there and talks;
And tells how tight her pistons are,
And how the whole rear end is new.
He tells it o'er and o'er each day,
'Til even he believes it's true.

With loving care he shuts her doors,
While letting prospects in and out,
For fear her hinges may pull loose
And bang the prospect on the snout.
Her fenders, layered with the paint
Of every shop in town, are held
Together with a piece of stuff
That's just one long continual weld.

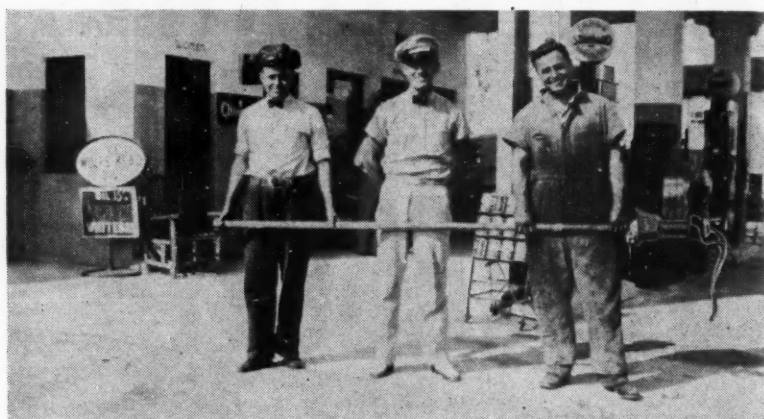
The camber and the caster, too,
That long ago she once possessed,
Are gone. Her axle shows the marks
Where crowbars, jacks and chains
have pressed.
Her fenders rattle in the wind.

Her frame is just a graceful sag,
And on her radiator hangs
A flashy price reduction tag;
But all she needs to make her sell,
Including every knock and squeak,
Is just another coat of paint;
Some tinkering and anti-leak,
A little bracing here and there,
And bright and shiny once again,
She'll sell, and in about a month
The owner trades her in—and then—
(Second verse, repeat from the beginning.)

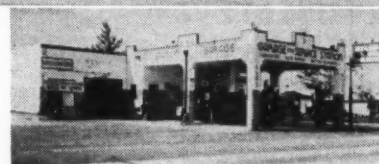
In its search for new Chevrolet buyers, the Columbia Chevrolet Company, of Vancouver, Wash., used the above in their ads.

Ty.

They Licked A Hurricane



Left to right, Faust Parcinski, Frank Parcinski, Bud Varitoni. When a hurricane blew down power lines they rigged a pitcher pump to dispense gasoline, used hand pumps to give free air, generated light on their own Diesel generating plant, made themselves known to scores of motorists who never before had given them business



Hurricane Service

The Florida hurricane hadn't quite subsided before Bud's Garage on the Federal highway in Hollywood, Fla., was ready for business as usual.

Power lines were down and the pumps wouldn't work, but that didn't stop Bud's. Bud's have their own DC lighting system, and as night came on the garage had light when all else was in darkness.

The pumps and air compressor being of the AC type, Bud Varitoni, Faust and Frank Parcinski, manager and co-owners, met the emergency by rigging up pitcher pumps to dispense all available gasoline from the tanks.

Bud's also continued to serve "free" air by taking hand-pumps from stock and using them. After wearing out seven they used the air compressor on their Packard sedan until the packing in it wore out.

It was a week before the power lines were repaired, and Bud's "handed" out service until they had power for their pumps again. At night business men who necessarily had to keep records up to date used Bud's Garage as headquarters, because Bud's was the only place with ample lighting facilities. All others were doing business by the light of lamps and lanterns.

Bud's "dished out" service during a hurricane, now as their profits show—they "can take it."

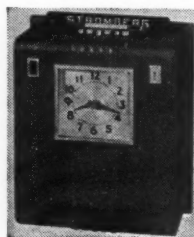
Mechanic's Union Organized

The Salt Lake Automobile Mechanics' Union is being organized here. Membership is expected to reach 150 to 200. It will be the first union of automobile mechanics in the Utah capital for a long time, it was stated in December.

Fiber Fitting Tool Reduces Run-In Time

After installing a new set of distributor points, it has been found that the gap setting soon changes due to the rapid initial wear of the contact arm fiber block. To remedy this condition the Norwich Tool Co., Norwich, N. Y., has developed a fiber fitting tool which is said to make it possible to give the fiber bumper a perfect bearing on the cam at the time of installation. The tool is inserted between the fiber and the cam and moved up and down to cut off the high points and corners of the fiber. It is claimed that with the fiber properly fitted to the cam, the dwell of the points is lengthened to give the coil proper time to build up.

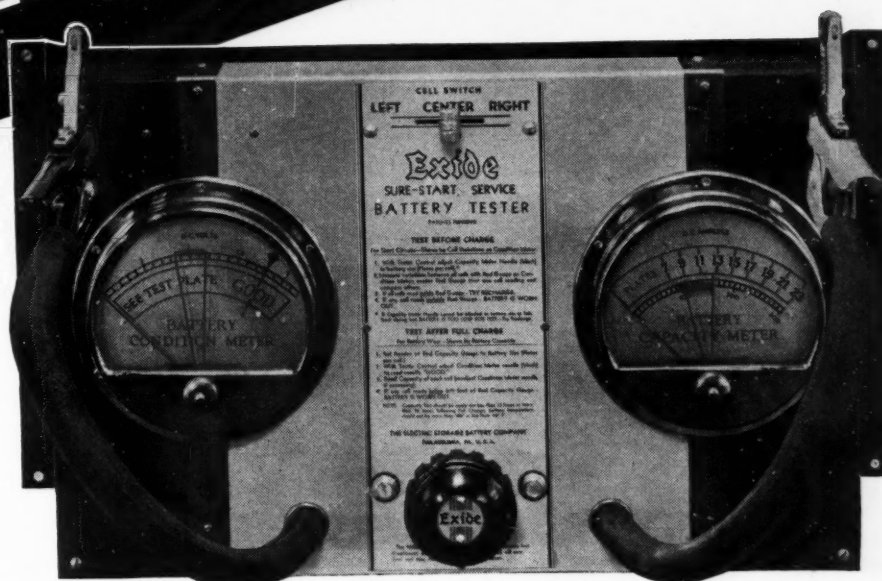
Stromberg Recorder Checks Time on Each Job



The Stromberg electric time recorder makes it possible to keep an accurate record of the time spent on each job in the shop. It is small in size, yet can take a full-size standard time card. A feature of

this time clock is that it requires only one hand to operate. Equipped with a Telechron motor it can be plugged into any electric light socket. This recorder is a product of the Stromberg Electric Co., 223 West Erie Street, Chicago.

**BETTER THAN
AN X-RAY MACHINE!**



The Exide Sure-Start Tester

The Exide Sure-Start Tester is a marvel—the way it “sees” inside a battery and shows your customers what it finds. It detects separator failure. It shows plate wear. It does more than any X-ray machine possibly could do, because it interprets the condition of the battery so that car-owners can understand—and be convinced!

This tester is a scientific instrument of utmost precision. In addition, it is one of the most valuable merchandising developments ever placed in the hands of a battery dealer.

The Exide Sure-Start Tester is only part of the Exide Sure-Start Plan. It is offered to Exide Sure-Start Dealers alone. Why not see your Exide wholesaler today—or write direct to us?

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

EXIDE HYCAP

A new line of *extra high capacity* batteries with ample power for heater, radio, lights, defroster and other accessories, and plenty of reserve for “touch and go” starts in any weather.



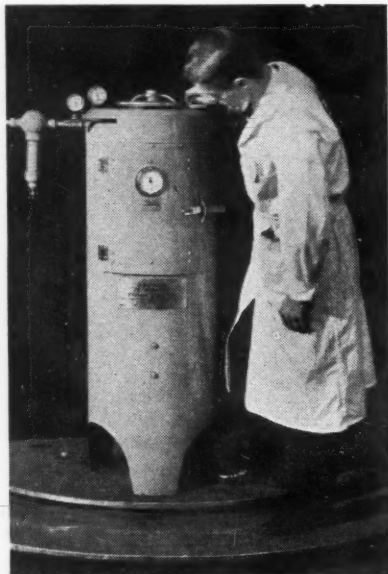
WHEN IT'S AN EXIDE



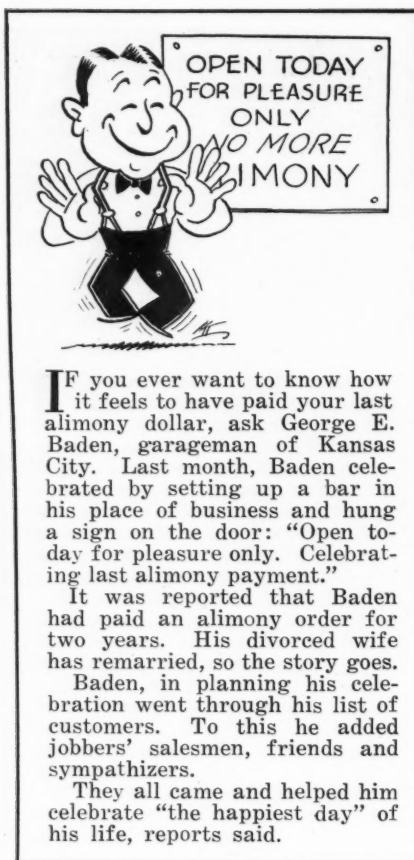
YOU *START*

Koetherizing Process Resizes Worn Pistons

The American Hammered Piston Ring Co. of Baltimore, Md., has developed the Koetherizing process which resizes worn aluminum pistons to the exact diameter desired. This process consists of the application of a blast of steel shot against the two inner thrust sides of the piston skirt wall, throughout its length, for a



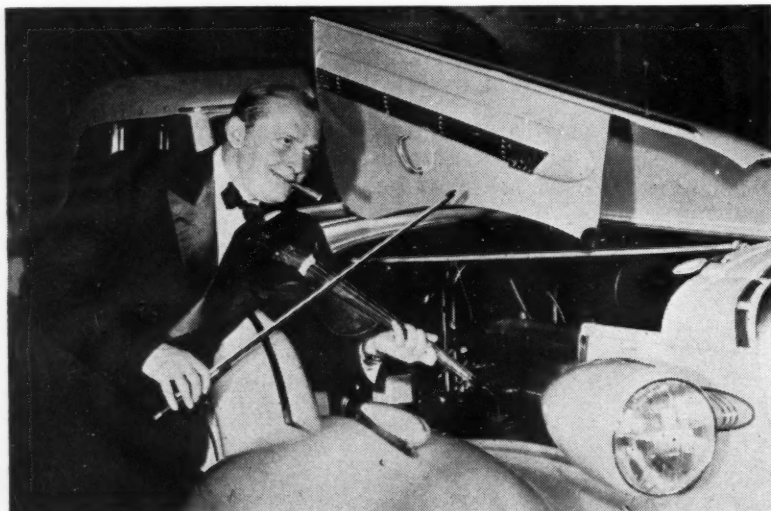
specified length of time and at a specified air pressure. For example on a Ford V8 piston in order to secure .005 in. expansion over standard, a pressure of 60 lbs. is required, and the application of the shot must be made for 4 seconds on each side of the piston. A table is furnished with the machine indicating the exact time re-



quired to bring different size pistons up to the necessary oversize.

An interesting feature claimed for this process is that it increases the density of the aluminum and imparts a tension to the metal which is permanent, so that pistons resized to a certain diameter hold that size. The manufacturers state that the Koetherizing process produces no piston boss distortion and does not disturb the piston pin fit.

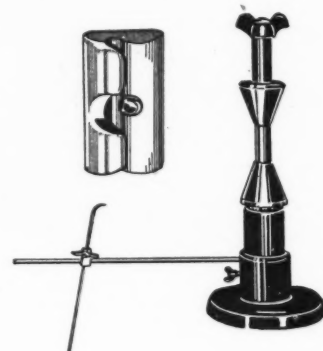
Here's One For Walter Winchell



Ben Bernie, the old maestro, is shown eavesdropping on a Buick valve in head engine. It was reported that he tuned his fiddle to the music of the engine.

Loney Balancing Stand Aids Wheel Servicing

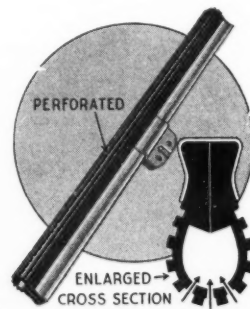
The Harley C. Loney Co., Detroit, is marketing a balancing stand that fastens to the wall, post or bench and will handle any type of automobile wheel. Features include two heavy-duty ball bearings, with dust proof casings, balanced steel cones hardened and ground and a chrome plated gage for checking wheel wobble and radial



run out. This device indicates when a wheel is out of balance, and suitable weights can be added to correct the condition.

Rex-Hide Presents New Hollow Wiper Blade

The Rex-Hide windshield wiper blade consists of a hollow, perforated tube of soft, carbon base rubber, set in a shaft of stainless steel. It is claimed that as the blade sweeps across the glass, alternate areas of pressure and vacuum are created, forcing water through the holes and constantly cleaning the wiping ribs. The constant flexing of the rubber is



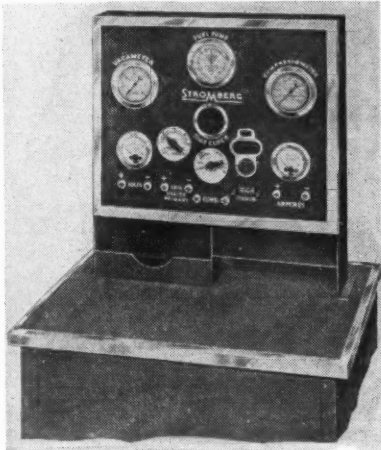
said to prevent ice and snow accumulations, except under the most severe conditions. This wiper blade which retails for \$0.35 is a product of Rex-Hide, Inc., East Brady, Pa.

Chicago Clinic April 4-8

The Illinois Automotive Association will stage an exhibit of maintenance equipment and materials on the Navy Pier, Chicago, April 4 to 8, 1936. The exhibit is intended primarily for the trade and it is planned to send individual invitations to all automotive retailers within 150 miles.

Many Tests Possible on Stromberg Analyzer

The Stromberg Motoscope C provides a ready means for testing coils, condensers, distributors, fuel pumps, engine compression, etc. For testing ignition coils a time control is provided for heating the coil to normal temperature, and a constant-speed, 110-volt motor drives an accurately machined cam producing the same op-



erating conditions which are found at low, medium and high engine speeds. This outfit, which is a product of the Stromberg Motoscope Corp., 2130 Lawrence Ave., Chicago, Ill., retails for \$125.00.

Amcobond Linings Withstand Heat

The illustration shows four stages in the preparation of Amcobond brake lining, which are said to render it impervious to heat and therefore able to withstand the friction load of sudden brake application at high speed. The top, or first stage, shows the asbestos yarn reinforced with fine brass wire, woven into open-mesh, porous fabric. The second stage shows this fabric after it has been water-proofed and oil-proofed. Next the friction compound is forced under great pressure through the fabric, between and into its strands. The bottom or fourth stage shows the final product. Under heavy pressure and heat the material is said to be completely unified or bonded so that it can withstand high friction heat and give uniform service.

Amco brake lining is a product of the Asbestos Mfg. Co., Huntington, Ind. * * *

Appointment of M. H. Alldredge as sales manager of Thompson Products, Inc., was announced by M. P. Graham.

Sloan Will Get Medal to Ford Music



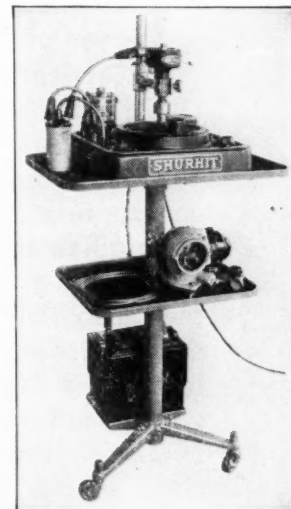
Philadelphia's Poor Richard Club will award Alfred P. Sloan, Jr., its Gold Medal of Achievement for contributions to national advancement; Fred Waring, musician, will also be honored for his broadcasts; presentations will be made in Philadelphia at banquet January 17, 1936.

Urge Mechanic License Law

The province of Ontario bids fair to lead the rest of the Dominion of Canada in the matter of examining and licensing of motor mechanics. The Garage Operators Association has interested the Provincial Government in the idea of bringing the repair trade under the Apprenticeship Act, whereby a man would become a full-fledged journeyman in seven years. Men of five years' experience or more would be given tickets to start. Opinions on the plan are being obtained.

New Shurhit Equipment Tests Any Ignition System

Among the new developments of Shurhit Products, Inc., Waukegan, Ill., is a stroboscopic analyzer designed to accurately check and adjust



any type ignition system. Points can be set and synchronized, the cam angle checked, and coils, condensers and plugs tested on this unit. Price to trade, \$125.

Other new products include a fly-wheel synchronizing lamp and a condenser tester. The latter will operate on 110 volt A. C. current, and produces in excess of 500 volts D. C. for breakdown test. This unit measures capacity as well as resistance. Dealer price, \$18.50.

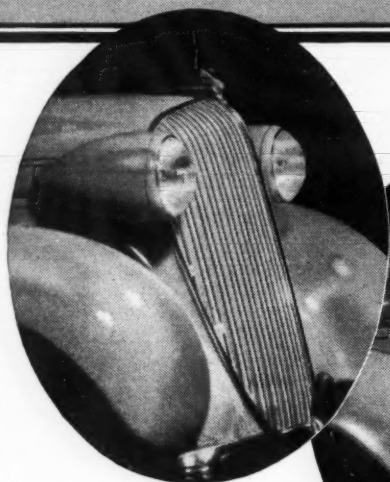
Join the "Money - of - The - Month Club"—See Page 35.

"THE Music Goes Round and Round," current song which is driving jazz orchestra leaders slightly insane, may have had its origin in an old Ford Model T joke book. For, according to one who knows, the following poem appeared in the old gag manual:

From A Ford Model T Joke Book

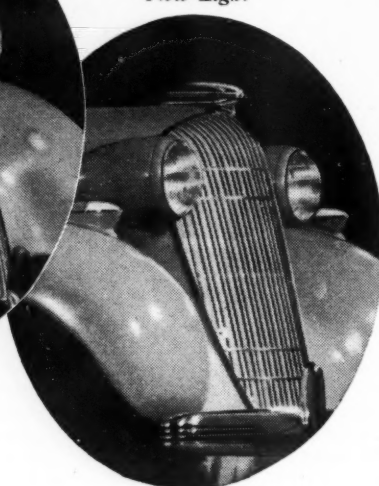
"The Wheels Go Round and Round"
You press this pedal down.
The wheels go round and round.
Whoa! Ho! Ho!
Where do we go from here?
You press the next pedal down.
The wheels go round and round
Whoa! Ho! Ho!
Back we go from here.
When the motor sounds like thunder,
You must get out and get under,
way down below, below, below,
oh!
You press the next pedal down.
The wheels go round and round.
Whoa! Ho! Ho!
We'll never go from here!

Here's a Dealer Franchise Made-to-Order for



*A Big Roomy
New Six*

*A Luxurious
New Eight*



There are definite reasons why Oldsmobile dealers throughout America are in a position to make real money in 1936. Here are nine of them, in clear and concise form. Read them over and you will understand why so many dealers in every section of the country have found the Oldsmobile Franchise one of the most desirable of all. Oldsmobile dealers know, from their own experience, what these nine points mean in profit possibilities . . . know that they establish this franchise as one franchise that is *made to order for making money!*

● 1. PRODUCT POPULARITY

Everybody in the industry knows that Oldsmobile sales were doubled in 1934 . . . doubled again in 1935 . . . and that the public acceptance of the Oldsmobile Six and Eight is one of the most phenomenal demonstrations of popularity enjoyed by any car in years.

● 2. LIBERAL DISCOUNTS

The new 1936 Oldsmobile Franchise provides very liberal discounts. Its discount schedules take into consideration types of cars, and sales of parts and accessories.

● 3. GOOD CAR DISTRIBUTION

Oldsmobile's car distribution system assists the dealer in getting exactly the right car to fill each specific order. This means that cars are built from dealers' orders . . . even to such specifications as body type, color, upholstery, equipment, etc.

● 4. FRIENDLY FACTORY-DEALER RELATIONS

Oldsmobile is noted throughout the industry for fair, square, friendly and helpful relations with its dealers. Oldsmobile promotes their interests along with its own.

● 5. AMPLE TERRITORY FOR EVERY DEALER

Oldsmobile establishes only one dealer in a

OLDSMO

that's Making Money!

town except in metropolitan cities. Each dealer is assured an ample potential for a highly satisfactory profit opportunity.

● 6. TERRITORY PROTECTION

Oldsmobile protects its dealers in the cities in which they are located . . . giving no selling rights therein to dealers in adjacent towns.

● 7. BUSINESS MANAGEMENT ASSISTANCE

Where dealers desire it, Oldsmobile provides, without cost, the assistance of men who have had years of experience in analyzing thousands of retail operations, and who are qualified to counsel with dealers on their operating problems.

● 8. STRONG ADVERTISING

Oldsmobile carries on a consistent campaign of national advertising . . . but a special feature of Oldsmobile's advertising program is the local advertising run for dealers in their own communities over their own firm names.

● 9. PRACTICAL SALES PROMOTION ASSISTANCE

Oldsmobile dealers receive throughout the year a program of practical, timely sales promotion helps on both new and used cars — every one of them designed solely to *help sell more cars at a profit.*

It is not by chance that Oldsmobile dealers throughout the United States enjoy a happy profit position. Oldsmobile has planned carefully in the dealer's interests. Oldsmobile realizes that its own success is closely linked with that of its dealer organization . . . has built its Dealer Franchise, and established its policies on the basis of understanding co-operation, with one important end in view: —To give every Oldsmobile dealer an opportunity to build for himself a permanent and prosperous business.

Why not investigate the money-making possibilities of the Oldsmobile Franchise for 1936? A letter or telegram will bring you full particulars . . . and you can be assured that your inquiry will be held in strictest confidence. Address D. E. Ralston, Vice President and General Sales Manager, Olds Motor Works, Lansing, Michigan.



NEW LOW-COST 6% G. M. A. C. TIME PAYMENT PLAN

**Sixes \$665 and up . . . Eights \$810 and up, list prices at Lansing, subject to change without notice. Safety Glass standard equipment all around. Bumpers with guards, spare tire, and rear spring covers built into all cars at the factory at extra cost. A GENERAL MOTORS VALUE*

B I L E \$ 6 6 5 *

Plymouth Dealers Now Have Factory Flat Rate Prices on 1936 Models

Below is a selected list of the time required to do various flat rate operations according to the new flat rate manual issued by the Plymouth Motor Car Co. covering its 1936 models P1 and P2.

The operation numbers given below are Chilton numbers as used in the current Chilton Flat Rate Manual, while the times corresponding to those operations have been taken from the Plymouth factory flat rate manual.

Plymouth P1-P2—1936

Opr. No.	Mfr. hrs.	Opr. No.	Mfr. hrs.	Opr. No.	Mfr. hrs.	Opr. No.	Mfr. hrs.
A7x.	2.1	C10x.	.7	L6.	.8	U1.	No
A9x.	.4	C12.	2.2	L7.	2.5	U2.	.5F
A10.	.8	C13.	2.2	L11.	.5E	U3.	No
A11.	1.5	D3.	1.4	M1.	2.7	U3x.	.6
A12.	2.4	D4.	.6	M4.	3.4	U4.	.8D
A13.	No	D7.	No	O1.	.5	U6.	No
A14.	3.0	D7x.	1.5	O3.	3.0	U6x.	.5
B3.	.5	D8x.	No	O4.	3.0	U7x.	.4
B4.	2.0A	D11.	No	O7.	No	U9.	1.0
B4x.	2.0A	D11x.	1.5	O14.	4.5	U12.	.7
B6.	.7	D12.	1.0	P1.	2.5	U13.	1.0
B8.	2.0A	D13.	1.2	P3.	5.0	U15.	No
B12.	1.3	F6.	2.0	P5.	No	U16.	.4
B13.	4.3A	F9.	No	Q1.	1.0	U17.	.6
B13y.	10.6	F10.	1.6C	Q5.	.5	U17x.	.4
B16.	.5	F13.	1.2	Q6.	.6	U19.	.2
B17x.	No	F15.	1.5D	R2.	4.3	U21.	.5
B18x.	1.0	F19.	.4	R4.	1.0	U22.	.4
B20.	1.0B	F20.	.4	R5.	6.3	V1.	2.0
B22.	.5H	G3.	No	R9.	5.7	V3.	1.2
C1.	2.7	H1.	5.5	R12.	.9	V5.	1.0
C2.	1.2	H5x.	1.8	S1.	.3	W1.	.6G
C5.	.4	H5a.	.4	S9.	.5	W2.	.6G
C6.	.4	L1.	6.0	S10.	.5	X1.	1.4
C8.	.3	L1a.	4.5				

A—Includes bleeding.
B—Includes adjust shoes.
C—Includes clean carbon.
D—Includes retune ignition

E—Both plates.
F—Does not include retune.
G—Includes adjust brakes.
H—Does not include pedal adjustment.

Chevrolet Dealers Get \$20 for Each Junked

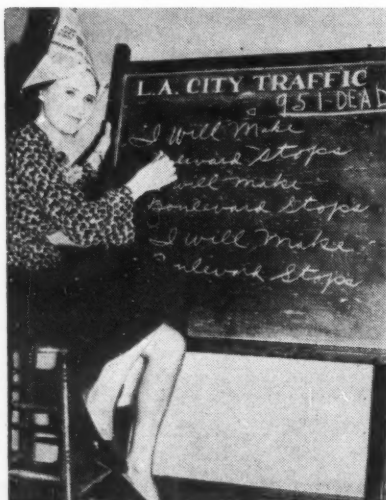
Chevrolet Motor Co. began the new year with a \$1,000,000 cooperative plan to help move its dealers' stock of used cars, and to remove unworthy vehicles from the highways, M. E. Coyle, president of the company, announced recently. Beginning on New Year's Day and continuing throughout January two important special activities will run concurrently. First, Chevrolet will pay to the dealer \$20 for every old automobile accepted in trade on a new or used car that he disposes of by scrapping or junking. Second, Chevrolet will pay a bonus to salesmen whose efforts enable their dealership to sell more used cars in January than it sold in the same month of 1935.

Ramco Adds Two New Sets To Line



The Ramsey Accessories Mfg. Corp., St. Louis, Mo., has announced two new Ramco motor overhaul sets. The new No. 60 set will take care of the 3 1/4 in. bore Chrysler, DeSoto and Dodge cars, and the No. 61 set is for the 1935-36 Dodge. It includes 12 compression rings, 12 oil control rings and 6 piston skirt expanders. The retail price is the same on both sets, namely \$15.00.

Home Work



A Los Angeles judge, in an attempt to reduce traffic violations, has borrowed a punishment that dates back to the days of the little red schoolhouse. He will make traffic violators wear dunce caps and write the manner of their violation 1000 times on a blackboard.

Midget Magnet Made

A small permanent magnet made of "Alnico" was shown recently at the Schenectady laboratories of General Electric Co., it was reported in the *Aluminum News-Letter*. This is made of a new iron alloy containing aluminum, nickel and cobalt. So powerfully magnetic is this alloy that it lifts 60 times its own weight, the report said.

The *News-Letter* suggests that this alloy may displace small electro-magnets in motors, transformers and loud speakers because it will simplify construction and reduce costs.

Diesel Powered Dodge Truck Denied by Burke

J. D. Burke, Dodge truck sales manager, has said that there is no truth in the report that Dodge will offer its own Diesel motor for Dodge trucks within 30 days, according to *Automotive Industries*. Mr. Burke said that Dodge doesn't even sell a chassis for a Diesel motor, but has, of course, been experimenting for years on a Diesel engine.



"You might give my car a wash off before you put the hose away, boys"

ECONOMY is all-important in carburetor replacements!

REASON NUMBER 1 for the sweeping success of

Stromberg
Factory-Rebuilt Exchange
CARBURETORS



No need to tell *you* that the smaller the investment involved, the less selling it takes to persuade a car owner to have a new carburetor installed on his car after it's two or three years old.

That's why Stromberg has introduced this low-cost, common-sense replacement service. And that's why it's been a real success from the start!

Good profit, little or no labor investment, no complicated, exacting service work (such as you'd have to do if you were to rebuild the old carburetor yourself). And your stock investment, too, may be very small.

Send the coupon below for the "Make-and-Model" sheets and complete information.

BENDIX PRODUCTS CORPORATION
401 Bendix Drive, Dept. 11, South Bend, Indiana

Send me full details about your new Stromberg Carburetor Rebuilding Proposition.

Name

Address

City..... State.....

Nature of Business.....

MERCHANDISING CALENDAR

SUN

MON

TUE

WED

THU

FRI

SAT

1

2

3

4

WINTER SERVICES

Check generator armature and brushes. Turn down armature and install new brushes when necessary.
Check starter armature and brushes. Also starter drive. Repair or install new parts as required.
Check ignition distributor, including cap, breaker points, and distributor shaft bushing. Repair or install new parts as required.
Adjust breaker points and retune ignition.
Check ignition condenser. Install new unit when required.
Check ignition coil. Install new unit when required.
Check engine ground connection on rubber-mounted engine.
Clean and adjust spark plugs. For chronic hard starters reduce size of spark-plug gap.
Check ignition high-tension cable. Replace if necessary.
Clean all fuel screens.
Clean and adjust carburetor, including accelerating pump.
Check adjustment of automatic choke.
Free and adjust brakes. Reline if necessary. Touch up rust spots and paint top.
Clean air filter.
Regroove tires.
Install windshield defroster.
Overhaul chains.
Lubricate wheel bearings.
Tighten all body bolts.

Flush cooling system. Check for leaks and repair if necessary. Fill cooling system with anti-freeze.
Check hose connections. Install new ones when necessary.
Check cooling system thermostat.
Check water pump and water pump packing. Tighten packing gland or install new packing as required.
Install winter front.
Install car heater.
Drain and flush engine crankcase, transmission and rear axle and refill with winter-grade lubricant.
Check engine compression. Grind valves, install new pistons and rings when necessary.
Adjust valve tappets.
Check battery. When necessary, recharge or install new battery. For chronic hard starters, install larger battery.
Clean battery terminals and ground connection. Install new cables when necessary.
Clean and tighten all other electrical connections in primary ignition circuit and in lighting circuits.
Check and lubricate all steering connections including gears, drag link and tie rod.
Check springs for breakage, tighten and lubricate all spring shackles.
Check windshield wiper—install new blade.
Check generator and increase charging rate.

WINTER SUPPLIES

Anti-Freeze
Ash Receptacle
Auto Radio
Auto Trunk
Battery
Battery Tester
Car Heater
Cigar Lighter
Clock

Car Owner's Tool Kit
Direction Signal
Driving Gloves
Emergency Chains
Fender and Cowl Lights
Floor Mat
Foot Warmers
Home Battery
Chargers

Horn
Lamp Bulbs
License Plate Holders
Luggage Carrier
Mirror
Mirror-Clock
Oil Filter
Oil Filter Cartridge
Polish and Cleaner

Robes
Spark Plugs
Seat Covers
Seat Cushions
Spotlight
Thermostat in Cooling System
Tire and Tube Repair Kit

Tire Accessories
Tire Chains
Tire Covers
Tire Locks
Tires Tubes
Trunk Rack
Vanity Case
Ventilators
Windshield Defrosters

New Stanley Steamer Going Into Production

August, 1928, saw the last of the old Stanley Steamers come off the assembly line at the factory in Waltham, Mass. The next three months, pending negotiations that are now under way, may see them coming off again, this time in Chicago.

Production will probably begin within the next 90 days, Harry W. Gahagan, president of Stanley Steam Motors Corp., successor to Stanley Steam Motor Carriage Corp., told

AUTOMOTIVE INDUSTRIES. Present negotiations for volume output of the steam power plant are nearing completion, it is reported, and their eventual consummation appears assured, according to Mr. Gahagan.

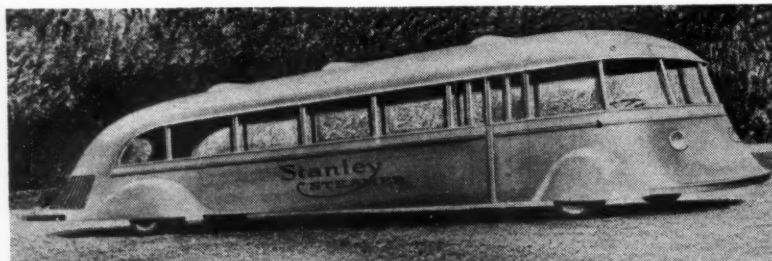
According to the Stanley president no attempt will be made to invade the passenger car field at the outset. Rather the company will confine its efforts to the bus field initially, later attacking truck problems and then the tractor field. Passenger car engine production will be the last attempted, if at all. Present plans call for production of two sizes of engines, one

for buses of 22-passenger capacity and the other for 44-passenger buses. Both power plants will be of such size, it is said, to give a speed of 60 m.p.h. at 900 r.p.m.

Motor Recoditioning Guide Provided by Pedrick

A set of five lacquered cards, 13 in. x 18 in., with information on about 25 items covering motor reconditioning work on 500 passenger car models, going back 7 years or more, is being supplied to leading dealers by the Wilkening Manufacturing Co., Philadelphia, maker of Pedrick hydraulic piston rings.

According to the Pedrick organization, this is the first time that any one has made available to the trade so much motor reconditioning data in such concentrated and durable form. The set of five cards is contained in a metal holder inside the door of the new Shop Cabinet which is another feature in the 1936 Pedrick program.



Streamline suggestion of a New Stanley Steamer

Changing: the All-American Menace



THIS MAN drives automobile dealers crazy. He's the carping, complaining, hyper-critical fellow who finds *everything wrong* with his brand-new car.

He'll hear knocks where you can't catch a murmur. He'll say the car lacks power when it would haul an elephant up the toughest hill in your part of the county.

Fortunately, there aren't many like him. But a few "beefers" can do a lot of harm.

Often a potential "beeper" can be turned into a booster—and luke-warm owners fanned into red-hot

enthusiasts, *if you give the car an extra-swell send-off*. And that, to many dealers, means this . . .

See that the crankcase is filled with the world's finest motor oil—*Gulfspride*. There isn't another oil made that can do so much to keep a good motor good. This 100% Pure Pennsylvania Oil, thanks to Gulf's exclusive Alchlor process, forms only *one-fifth* as much carbon as the next best oil made.

And in the tank put Gulf No-Nox Ethyl, *Aviation Grade Gasoline*. It makes a fast car faster. It gives an owner "throttle thrill." It puts a

world of extra power beneath that brand-new hood.

Do this, and you've got another customer who's going to grin and gossip—and get his friends in the mood to buy your cars.

Try this simple Gulf plan. Mail the coupon below for an interesting call by a Gulf salesman, plus copies of that helpful Gulf booklet—"15 Ways to Save Gasoline Money"—to distribute to your customers.

**MAIL THIS COUPON
RIGHT NOW!**



GULF REFINING COMPANY
PITTSBURGH, PA.

DISTRICT SALES OFFICES:

Boston New York Philadelphia Atlanta New Orleans
Houston Pittsburgh Louisville Toledo



GULF REFINING COMPANY
3800 Gulf Building, Pittsburgh, Pa.

MA-1-36

Gentlemen:

I would like to have a salesman call and tell me all about the Good Gulf franchise—also, copies of your free booklet, "15 Ways to Save Gasoline Money."

Name _____

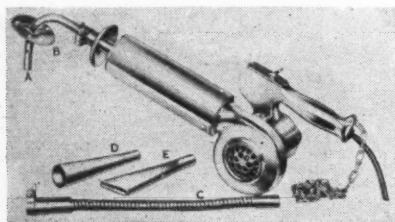
Address _____

City _____ State _____

Electric Heat Blower

Thaws Frozen Radiators

The model 58 Tornado electric heat blower has a special nozzle for thawing frozen radiators, pumps, drains, etc. Delivering a blast of air at 640 deg. F. it can also be used to melt grease and to dry distributor heads,



coils, spark plugs or any other part of the ignition system that is water soaked. Vent holes are provided which insure free air passage in case the end of the nozzle gets plugged. Made by the Bruer Electric Mfg. Co., 860 Blackhawk St., Chicago.

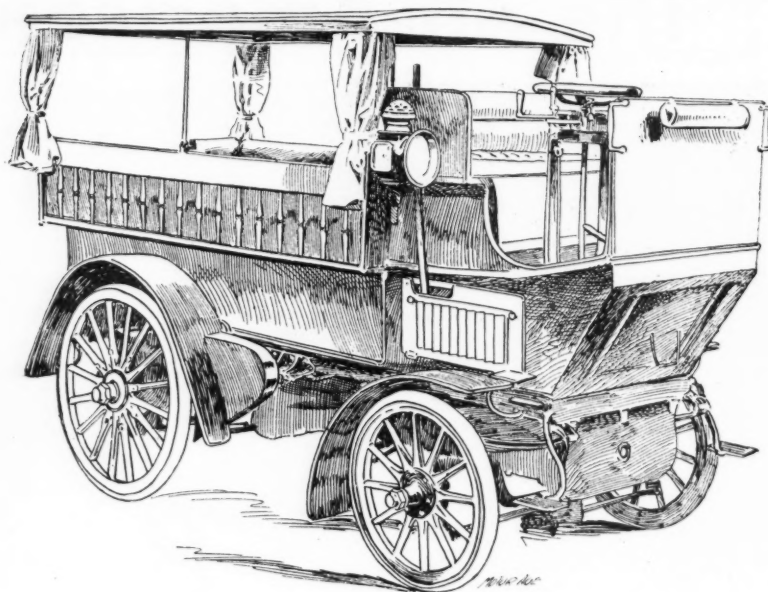
New Penetrating Oil That Will Not Drip

The American Grease Stick Co., Muskegon, Mich., announces a new dripless penetrating oil which, according to the manufacturers, will penetrate the tightest fittings and hinges in a few seconds, then quickly congeal into a full-bodied lubricant that will not run out even when submitted to high temperatures. This oil is supplied in a 4 oz. controlled flow can.

Mass. Servicemen Elect

The Automotive Service Men's Association of Springfield, Mass., at its annual election on December 10 chose the following officers: President, A. L. Brosseau; vice president, Fred Ferrara; treasurer, E. E. Tovet; secretary, R. T. Busha. The directors elected are J. T. McCormack, C. August Krohne and R. Billings.

Thirty-five Years Ago In Motor Age



"Mammoth Gasoline Carriage Belonging to the Prince of Wales"—*Motor Age*, January 2, 1901.

H. R. H. George, Prince of Wales (now King George of England) was hailed thirty-five years ago as "His Royal Sportingness." *MOTOR AGE*, January 1901, reported that the Prince "owns three motor vehicles and all are gigantic in the measure of ordinary sizes. He has one regular 12-horsepower Daimler wagon whose rear seats are covered by a hood, but his most royal outfit is the Titanic machine here illustrated." (See above).

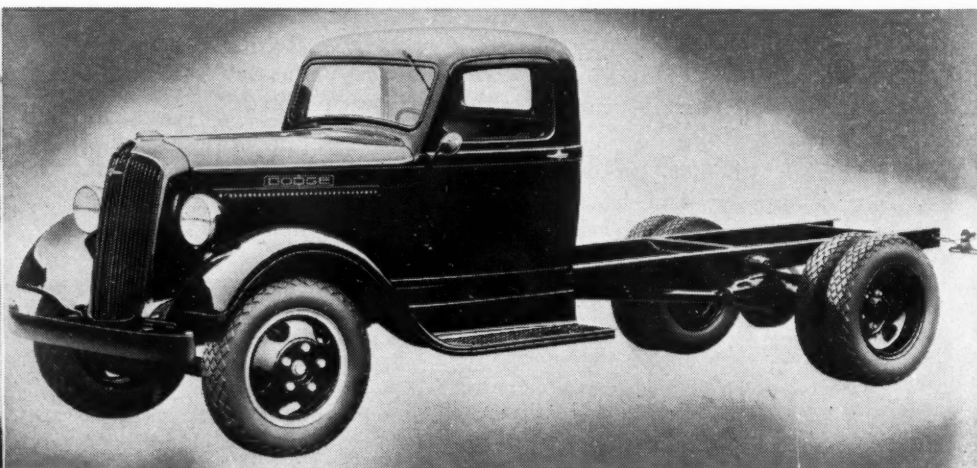
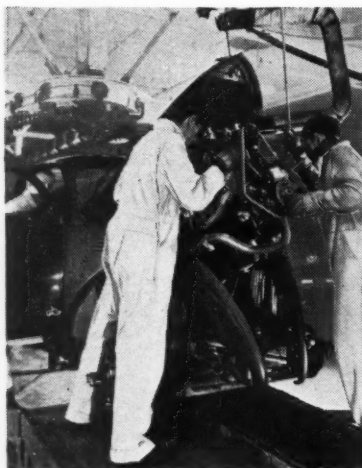
"that twenty-five miles an hour (for automobiles) is considered by manufacturers to be fast enough for all practical purposes. If more speed than this is possible," the expert said, "the places are so few and far between in this country where real fast traveling can be engaged in, that the machine is seldom allowed to show what it can do."

* * *

* * *

Malcolm W. Ford, who later achieved screaming headlines, was quoted in *MOTOR AGE* as saying

The cover of *MOTOR AGE*, January 2, 1901 advertised the "First Annual National Automobile Exhibit, at the Coliseum, Chicago, March 23-30" of that year.



PROCESSES used in the assembly of the Lincoln-Zephyr (left) are largely the reverse of those used in the manufacture of the conventional automobile. Mounting the engine is virtually the final major operation. (Right) One of the new 1936 Dodge series of trucks and commercial cars. Dodge 1 1/2-ton chassis and cab. Available in 129 in. wheelbase (for dump bodies), also 136 and 162 in. wheelbases.

The American System of Enterprise

(Continued from page 27)

to him through the voices of the leaders of his own people, he begins to take thought. "The old order changeth, yielding place to the new." Perhaps, without knowing it, we are already in the new order, an order of socialization of everything, principally wealth and property. If that is the case, he thinks, we may as well turn the direction of American affairs over to those

who believe in this socialization—or whatever they call it.

Yet it is pitifully obvious that European nations have surrendered to dictators, not because they reasoned that the time had come to organize themselves into regiments to perform all the tasks of life, but because they were in a state of revolution and utterly unable to reason about anything. Revolutions have almost always produced dictators. Almost. The American Revolution did not. The American mind does not work that way. It is too independent.

The United States came into being through this tolerant independence of thought. Through its driving power this nation has taken first place among the powers of the earth, and through its re-invigoration our people will continue to progress to higher standards of living than any yet established.

Let us see what we can find in the system by which this nation has grown great to warrant our faith in its power to perpetuate itself. Some call it "The Capitalistic System," but that does not describe it correctly. A more accurate designation is the "American System of Enterprise." The essential motivation of the system, however, can be stated in single words: Individualism, initiative, industry, independence.

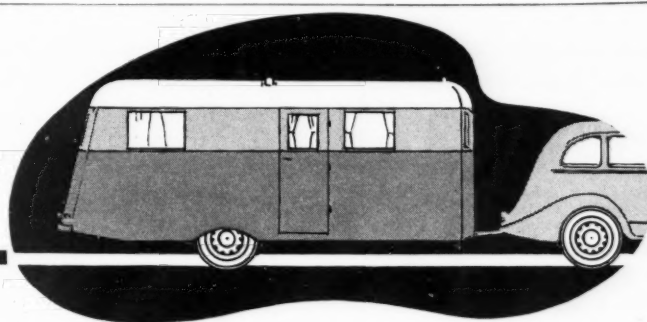
Thus the discoverers, who set out upon the stormy Atlantic in their frail barks bound for a wilderness of unknown terrors, were individualists of the first order.

Perhaps never in modern history was there such a distinguished gathering of individualists as those 56 men who put their names upon the Declaration of Independence. And what is to be said of the rugged individualists who fought under Washington to gain for themselves and hold for us the right to originate and carry on our private business without interference from government?

Such is the ancestry of the American system of enterprise, which began to take form immediately after the Revolution and reached full growth with the coming of steam, a quarter-century later. The steam engine started the inventors on their way to revolutionize completely the manner of living of the nation thereby setting in motion the machine age with its chain of industries extending back into the depths of the earth.

Nor were the inventors alone in their individualism. The railroaders, shipmasters, city-builders, machine-makers, manufacturers, quickly saw the opportunity to adapt the new inventions to their own enterprises which called for more money than inventors and promoters could scrape together between them. And here capital enters upon the scene in the shape of the bankers, who furnished the funds, usually their own, to launch the "Clermont," finance the Camden and Amboy Railroad or construct the cotton-mills of Fall River. The system, from the beginning, was a necessary welding of commercial, inventive and financial enterprise, and so it has remained to this day. None of the three could go it alone and any two would have made slow progress without the third. Together they have placed the United States in the forefront of the nations of the world in industry, wealth and power. They have given to the people the highest standards of living and of independence of action in all history.

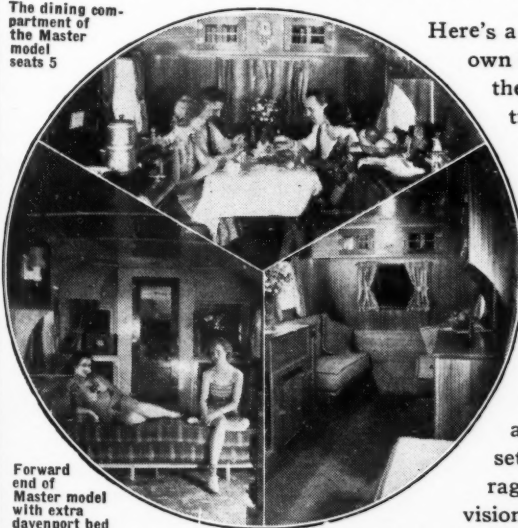
(Continued on page 80)



WANTED... 300 DEALERS TO SELL COVERED WAGON TRAILER COACHES

NO TRADE IN PROBLEM—NO ADDED EXPENSE—
A NEW BUSINESS OFFERING BIG PROFITS

The dining compartment of the Master model seats 5



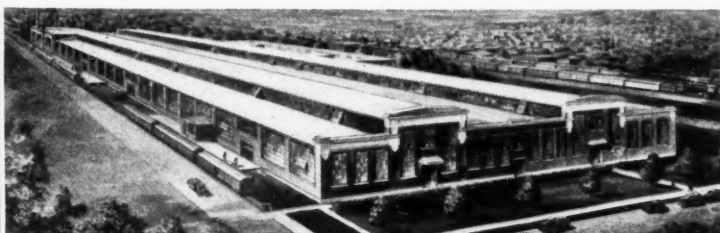
Forward end of Master model with extra davenport bed

Here's a natural development for your own business—with a new appeal—the rapidly growing demand for travel coaches by thousands of travel-hungry motorists. During 1935 our sales volume increased over 530%. Covered Wagon trailers are backed by extensive national advertising—are sold every month of the year. This is not a seasonal business—but a year 'round money maker. Perfectly adapted to fit into any automobile dealer sales setup—for service stations—garages — or car salesmen with vision and leg push.

Get the facts Now. Write for full dealer details.

Retail Prices
Master Model—\$395
De Luxe Model—\$785

COVERED WAGON CO.
MT. CLEMENS, MICHIGAN
Suburb of Detroit



The new Covered Wagon Plant comprises 110,000 square feet of floor space—occupies 15 acres of ground

THE WORLD'S LARGEST BUILDERS OF TRAILER COACHES . . .

Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the

Line Number	MAKE AND MODEL	Lowest Priced Sedan	Wheelbase (Ins.)	Tire Size (Ins.)	ENGINE														CHASSIS					
					No. of Cylinders, Bore and Stroke	Taxable H.P.	Piston Displacement (Cu. Ins.)	Maximum Brake H.P. at Specified R.P.M.	Compression Ratio (to-1.)	Cylinder Head Material	Camshaft Drive Make	Piston Material	Oil Cleaner Make	Air Cleaner Make	Carburetor Make	Muffler Make	Electrical System Make	Battery Make	Clutch	Gearset Make	Universals Type and Make	Rear Axle Type and Make	Service Brake Type and Make	Steering Gear Make
1	Auburn.....654	\$ 795	120	6.00/16	6-3 1/2x4 3/4	22.5	209.9	85-3500	6.20	Al.	Whit.	Al.	Pur.	AC.	Str.	Buf.	A.	USL	P.Long.	WG.	Nb-Mec.	1/2 Col.	BH.	R.
2	Auburn.....852	1095	127	6.50/16	8-3 1/2x4 3/4	30.0	279.9	115-3600	6.50	Al.	Whit.	Al.	Pur.	AC.	Str.	Buf.	A.	USL	P.Long.	Det.	Nb-Mec.	1/2 Col.	BH.	R.
3	Auburn.....SC852	1545	127	7.00/16	8-3 1/2x4 3/4	30.0	279.9	150-4000	6.50	Al.	Whit.	Al.	Pur.	AC.	Str.	Buf.	A.	USL	P.Long.	Det.	Nb-Mec.	1/2 Col.	BH.	R.
4	Austin.....		75	3.75/18	4-2.2x3	7.8	45.6	13-3200	5.30	CL.	Spir.	Al.	No.	No.	Til.	Buf.	A.	USL	P.Rock.	WG.	F-Spi.	1/2 Sal.	M.m.	O.
5	Buick.....36-40	885	118	6.50/16	8-3 3/4x3 7/8	30.6	233.0	93-3200	5.55	CL.	LB.	Ala.	No.	AC.	Str.	Wal.	D.	Del.	P.Own.	Own.	m-Spi.	1/2 Own.	OH.	S.
6	Buick.....36-60	1090	122	7.00/15	8-3 3/4x4 1/2	37.8	320.2	120-3200	5.45	CL.	LB.	Ala.	AC.	AC.	Str.	Wal.	D.	Del.	P.Own.	Own.	m-Spi.	1/2 Own.	OH.	S.
7	Buick.....36-80	1255	131	7.00/16	8-3 3/4x4 1/2	37.8	320.2	120-3200	5.45	CL.	LB.	Ala.	AC.	AC.	Str.	Wal.	D.	Del.	P.Own.	Own.	m-Spi.	1/2 Own.	OH.	S.
8	Buick.....36-90	1845	138	7.50/16	8-3 3/4x4 1/2	37.8	320.2	120-3200	5.45	CL.	LB.	Ala.	AC.	AC.	Str.	Wal.	D.	Del.	P.Own.	Own.	m-Spi.	1/2 Own.	OH.	S.
9	Cadillac.....V8-60	1695	121	7.00/16	8-3 3/4x4 1/2	36.4	322.0	125-3400	6.25	CL.	Mor.	Ala.	No.	AC.	Str.	Old.	D.	Del.	P.Long.	Own.	Nb-Mec.	1/2 Own.	BH.	S.
10	Cadillac V8-70 & 75	2445	131-38	7.50/16	8-3 3/4x4 1/2	39.2	346.0	135-3400	6.25	CL.	Mor.	Ala.	No.	AC.	Str.	Old.	D.	Del.	P.Own.	Own.	Nb-Mec.	1/2 Own.	BH.	S.
11	Cadillac V12-80 & 85	3145	131-38	7.50/16	12-3 1/2x4 1/2	46.9	368.0	150-3600	6.00	CL.	Mor.	Ala.	Han.	AC.	DL	Old.	D.	Del.	P.Own.	Own.	Nb-Mec.	1/2 Own.	BH.	S.
12	Cadillac.....V16-90	7550	154	7.50/17	16-3x4	57.5	452.0	185-3800	6.00	CL.	Mor.	Ala.	Cu.	AC.	DL	Own.	D.	Del.	dp.Own.	Own.	Nb-Mec.	1/2 Own.	KP.	S.
13	Chevrolet. Mas. Con.	640	113	5.50/17	6-3 3/4x4	26.3	206.8	79-3200	6.00	CL.	Gear.	CL.	No.	AC.	Car.	Own.	D.	D.	P.Own.	Own.	m-Own.	1/2 Own.	OH.	O.
14	Chevrolet.....Master		113	5.50/17	6-3 3/4x4	26.3	206.8	79-3200	6.00	CL.	Gear.	CL.	No.	AC.	Car.	Own.	D.	D.	P.Own.	Own.	m-Own.	1/2 Own.	OH.	O.
15	Chevrolet.....Std.	535	109	5.25/17	6-3 3/4x4	26.3	206.8	79-3200	6.00	CL.	Gear.	CL.	No.	AC.	Car.	Own.	D.	D.	P.Own.	Own.	m-Own.	1/2 Own.	OH.	O.
16	Chrysler.....Six	875	118	6.25/16	6-3 3/4x4 1/2	27.3	241.5	93-3400	6.00	CL	Ch.	Al.	Pur.	Bur.	Car.	NS.	A.	Wil.	P.B&B.	Own.	Nb-UP.	1/2 Own.	LH.	G.
17	Chrysler.....DeLuxe 8	1045	121	6.50/16	8-3 1/4x4 1/2	33.8	273.8	105-3400	6.20	CL	Ch.	Al.	Pur.	AC.	Str.	NS.	A.	Wil.	P.B&B.	Own.	Nb-UP.	1/2 Own.	LH.	G.
18	Chrysler.....Airflow 8	1345	123	7.00/16	8-3 1/4x4 1/2	33.8	323.5	115-3400	6.20	CL	Ch.	Al.	Pur.	AC.	Str.	Bur.	A.	Wil.	P.B&B.	Own.	Nb-UP.	1/2 Own.	LH.	G.
19	Chrysler.....Air Imp. 8	1475	128	7.50/16	8-3 1/4x4 1/2	33.8	323.5	130-3400	6.50	AL.	Ch.	Al.	Pur.	AC.	Str.	Bur.	A.	Wil.	P.B&B.	Otwg.	Nb-UP.	1/2 Own.	LH.	G.
20	Cord.....	810	1095	6.50/16	8-3 1/2x3 3/4	39.2	288.6	125-3500	6.50	AL.	Whit.	Al.	No.	AC.	Str.	Buf.	A.	USL	P.Long.	Own.	Nb-UP.	1/2 Tu Own.	LH.	G.
21	De Soto.....Airstream 6	810	118	6.25/16	6-3 3/4x4 1/2	27.3	241.5	93-3400	6.00	CL	Ch.	Ala.	Pur.	Bur.	Car.	Own.	A.	Wil.	P.B&B.	Own.	Nb-UP.	1/2 Own.	LH.	G.
22	De Soto.....Airflow 6	1095	115 1/2	6.50/16	6-3 3/4x4 1/2	27.3	241.5	100-3400	6.50	AL.	Ch.	Ala.	Pur.	AC.	Car.	Own.	A.	Wil.	P.B&B.	Own.	Nb-UP.	1/2 Own.	LH.	G.
23	Dodge.....Six	695	116	6.00/16	6-3 1/4x4 1/2	25.3	217.8	87-3600	6.50	CL.	Ch.	Als.	Pur.	AC.	Str.	Own.	A.	Wil.	P.B&B.	Own.	Nb-UP.	1/2 Own.	LH.	G.
24	Duesenberg.....J		142-153 1/2	7.00/19	8-3 1/2x4 1/2	45.0	419.7	320-4200	5.20	CL.	LB.	Al.	Pur.	Y.	Str.		D.	Exi.	dp.Long.	Own.	m-Spi.	1/2 Own.	PH.	R.
25	Ford.....V8	520	112	6.00/16	8-3 1/2x3 3/4	30.0	221.0	85-3800	6.30	Al.	Gear	Al.	Yes.	Yes	Str.	Own.	O.	Own.	P.Os.	Own.	m-Own.	1/2 Own.	OM.	O.
26	Graham.....6-80	635	111	6.00/16	6-3x4	21.6	169.6	70-3500	6.80	Al.	LB.	Als.	No.	AC.	Mar.	Old.	D.	Wil.	P.Ill.	WG.	Nb-Spi.	1/2 Spi.	OH.	R.
27	Graham.....6-90	765	115	6.00/16	6-3 1/4x4 1/2	25.3	217.8	85-3300	6.70	Al.	LB.	Als.	No.	AC.	Mar.	Old.	D.	Wil.	P.Ill.	WG.	Nb-Spi.	1/2 Spi.	OH.	R.
28	Graham S. C. 6, 110	865	115	6.25/16	6-3 1/4x4 1/2	25.3	217.8	112-4000	6.70	Al.	LB.	Als.	Fram	AC.	Mar(s).	Old.	D.	Wil.	P.Ill.	WG.	Nb-Spi.	1/2 Spi.	OH.	R.
29	Hudson.....6-63	785	120	6.00/16	6-3x5	21.6	212.0	93-3800	6.25	CL	Ge°.	Al.	No.	AC.	Car.	Old.	A.	Nat.	P.Own.	Own.	Nb-Spi.	1/2 Own.	BH.	G.
30	Hudson.....S, 64-5-6-7	1255	120-127	6.25/16	8-3x4 1/2	28.8	254.0	113-3800	6.00	CL	Ge°.	Al.	No.	AC.	Car.	Old.	A.	Nat.	P.Own.	Own.	Nb-Spi.	1/2 Own.	BH.	G.
31	Hupmobile.....618-G	815	118	6.00/16	6-3 1/4x4 1/2	29.4	245.3	101-3600	5.75	CL.	Mor.	Als.	No.	Bur.	Car.	Old.	A.	Wil.	P.B&B.	WG.	Nb-Spi.	1/2 Spi.	LH.	R.
32	Hupmobile.....621-N	995	121	6.50/16	8-3 3/4x4 1/2	32.5	303.2	120-3500	5.80	CL.	Mor.	Als.	No.	Bur.	Car.	Old.	A.	Wil.	P.B&B.	WG.	Nb-Spi.	1/2 Spi.	LH.	G.
33	Lafayette.....3610	675	113	6.00/16	6-3 1/4x4 1/2	25.3	217.7	83-3200	5.61	CL.	Whit.	Als.	No.	AC.	Str.		A.	USL	P.B&B.	Own.	Nb-Mec.	1/2 Spi.	BH.	G.
34	La Salle.....36-50	1185	120	7.00/16	8-3x4 1/2	28.8	248.0	105-3600	6.25	CL.	Whit.	Al.	No.	AC.	Str.	Old.	D.	Del.	P.B&B.	Own.	Nb-Mec.	1/2 Own.	BH.	S.
35	Lincoln.....Zephyr	1275	122	7.00/16	12-2 3/4x3 3/4	36.3	267.3	110-3900	6.7	Al.	Gear.	St.	Yes.	Yes.	Str.	Own.	O.	Own.	P.Os.	Own.	m-Own.	1/2 Own.	MO.	O.
36	Lincoln.....V12		136-145	7.50/17	12-3 1/2x4 1/2	46.8	414.0	150-3400	6.38	Ala.	Ch.	Ala.	Pur.	Yes.	Str.	Own.	A.	Exi.	P.Long.	Own.	FF Tim.	MO.	O.	
37	Nash.....Ambassador	885	125	6.25/16	6-3 3/4x4 1/2	27.3	234.8	93-3400	5.70	CL.	Whit.	Als.	Own.	AC.	Str.		A.	USL	P.B&B.	Own.	Nb-Mec.	1/2 Own.	BH.	G.
38	Nash.....Amb. Super 8	995	125	6.50/16	8-3 1/4x4 1/2	31.2	260.8	102-3400	5.25	CL.	Ch.	Als.	Own.	AC.	Str.		A.	USL	P.B&B.	Own.	Nb-Mec.	1/2 Own.	BH.	G.
39	Nash.....400	740	117	6.00/16	6-3 3/4x4 1/2	27.3	234.8	90-3400	5.61	CL.	Whit.	Als.		AC.	Str.		A.	USL	P.B&B.	Own.	Nb-Mec.	1/2 Own.	BH.	G.
40	Oldsmobile.....F36	795	115	6.50/16	6-3 3/4x4 1/2	26.3	213.3	90-3400	6.00	CL.	Whit.	Ala.	No.	AC.	Car.	Hay.	D.	D.	P.B&B.	Own.	Nb-Mec.	1/2 Own.	BH.	S.
41	Oldsmobile.....L36	910	121	7.00/16	8-3x4 1/2	28.8	240.3	100-3400	6.20	CL.	Whit.	Ala.	No.	AC.	Car.	Buf.	D.	D.	P.B&B.	Own.	Nb-Mec.	1/2 Own.	BH.	S.
42	Packard.....36-120B	1075	120	7.00/16	8-3 1/4x4 1/2	33.8	282.0	120-3800	6.50	Al.	Mor.	Als.		AC.	Str.		A.	Pre	P.Long.	Own.	Nb-Mec.	1/2 Own.	LH.	O.
43	Packard.....8	2385	127-34-39	7.00/17	8-3 3/4x5	32.5	320.0	130-3200	6.50	Al.	Mor.	Als.	Pur.	AC.	Str.		A.	Pre	P.Long.	Own.	Nb-UP.	1/2 Own.	BP.	G.
44	Packard.....Super 8	2990	132-39-44	7.00/17	8-3 3/4x5	32.5	384.8	150-3200	6.30	Al.	Mor.	Als.	Pur.	AC.	Str.		A.	Pre	P.Long.	Own.	Nb-Spi.	1/2 Own.	BP.	G.
45	Packard.....Twelve	3960	138-144	7.50/17	12-3 1/2x4 1/2	56.7	473.0	175-3200	6.40	Al.	Mor.	Als.	Pur.	AC.	Str.		A.	Pre	P.Long.	Own.	Nb-Spi.	1/2 Own.	BP.	G.
46	Pierce-Arrow.....1601	3195	138-144	7.00/17	8-3 3/4x5	39.2	385.0	150-3400	6.40	Al.	Whit.	Als.	Pur.	AC.	Str.	Buf.	D.	Wil.	P.Long.	WG.	Nb-UP.	1/2 Own.	St.	R.
47	Pierce-Arrow.....1602	3695	138-144	7.50/17	12-3 1/2x4 1/2	58.8	462.0	185-3400	6.40	Al.	Whit.	Als.	Pur.	AC.	Str.	Buf.	D.	Wil.	P.Long.	WG.	Nb-UP.	1/2 Own.	St.	R.
48	Pierce-Arrow.....1603	4795	147	7.50/17	12-3 1/2x4 1/2	58.8	462.0	185-3400	6.40	Al.	Whit.	Als.	Pur.	AC.	Str.	Buf.	D.	Wil.	P.Long.	WG.	Nb-UP.	1/2 Own.	St.	R.
49	Plymouth.....P1	545	113	5.25/17	6-3 1/4x4 1/2	23.4	201.3	82-3600	6.70	CL.	Ch.	Ala.	Pur.	Bur.	Car.	NS.	A.	Wil.	P.B&B.	Own.	Nb-UP.	1/2 Own.	LH.	G.
50	Plymouth.....P2		113	6.00/16	6-3 1																			

Tune-Up Specifications

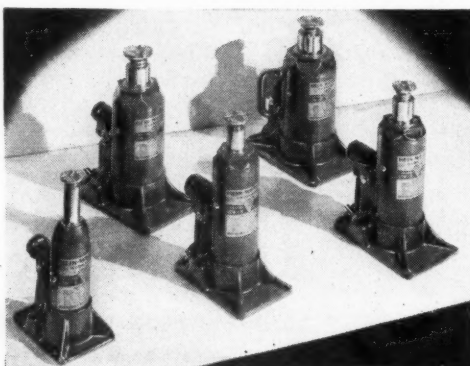
Car Manufacturers and Supersede All Others Previously Published

Compressor Pressure at Cranking Speed (Lbs.)	Spark Plug	RINGS		Piston Pin Diameter	Piston Pin Locked in	VALVES										IGNITION										Rods Removed From	Crankpin Diameter (Ins.)	Crankpin Length (Ins.)	Capacity Crankcase (Qts.)	Capacity Cooling System (Qts.)	FRONT AXLE					Line Number
		No. and Width Comp.	No. and Width Oil			Head Diameter and Seat Angle				Operating Tappet Clearance		Intake Valve Opens Before or After T.C.		Timing				Breaker Points Gap (Ins.)	Spark Plug Gap (Ins.)	Spark Occurs °TC	No. of Flyw. Teeth Spark Occurs TC	Breaker Housing	Caster (Degrees)	Camber (Inches)	Camber (Degrees)						Toe-in (Inches)	King Pin Inclination (Degrees)				
						Inlet (Ins.)	Inlet Seat Angle (Degrees)	Exhaust (Ins.)	Exhaust Seat Angle (Degrees)	Inlet Tappet Clearance for Valve Timing	No. of Degrees	No. of Flywheel Teeth	No. Teeth on Flywheel	Breaker Points Gap (Ins.)	Spark Plug Gap (Ins.)	Spark Occurs °TC	No. of Flyw. Teeth Spark Occurs TC																Breaker Housing			
																																		Inlet	Exhaust	
...	Ch-J6	2-1/2	1-1/2	7/8	R.	1 1/2	30	1 1/2	45	342	0.10H	0.10H	0.12	7 1/2	2 1/2	110	0.18	0.25	3B.	1B.	Au	B.	2 1/2	1 1/4	6 16	3 1/2-4	1 1/2	1.5	3/8	7 1/2	1					
...	Ch-J6	2-1/2	1-1/2	7/8	R.	1 1/2	30	1 1/2	45	342	0.10H	0.10H	0.12	7 1/2	2 1/2	110	0.18	0.25	3B.	1B.	Au	B.	2 1/2	1 1/4	8 20	2-3	1 1/2	1.5	3/8	7 1/2	2					
...	Ch-J9B	2-1/2	1-1/2	7/8	R.	1 1/2	30	1 1/2	45	342	0.10H	0.10H	0.12	7 1/2	2 1/2	110	0.13	0.25	3B.	1B.	Au	B.	2 1/2	1 1/4	8 20	2-3	1 1/2	1.5	3/8	7 1/2	3					
...	Ch-C7	2-3/4	1-1/2	3/4	R.	1 1/2	30	1 1/2	30	3/4	0.03H	0.04H	TC	TC	80	0.20	0.20			Re		1 1/2	1 1/4	4 6	5		1-1/4	1/2 ± 1/8	1 1/2	4						
...	AC-H9	2-1/2	2-3/8	5/8	R.	1 1/2	45	1 1/2	45	371	0.015	0.015	0.04	8B.	3 1/2	146	0.15	0.25	2B.	3 1/2	A.A.	A.	2	1 1/4	6 13 1/4	3-3 1/2		1-1/4	1 1/2	4	5					
...	AC-H9	2-1/2	2-3/8	5/8	R.	1 1/2	45	1 1/2	45	371	0.015	0.015	0.04	14B.	6B.	156	0.15	0.25	10B.	4 1/2	A.A.	A.	2 1/2	1 1/4	8 17	1 1/2-2 1/4		1-1/4	1 1/2	5	6					
...	AC-H9	2-1/2	2-3/8	5/8	R.	1 1/2	45	1 1/2	45	371	0.015	0.015	0.04	14B.	6B.	156	0.15	0.25	10B.	4 1/2	A.A.	A.	2 1/2	1 1/4	8 17	1 1/2-2 1/4		1-1/4	1 1/2	5	7					
...	AC-H9	2-1/2	2-3/8	5/8	R.	1 1/2	45	1 1/2	45	371	0.015	0.015	0.04	14B.	6B.	156	0.15	0.25	10B.	4 1/2	A.A.	A.	2 1/2	1 1/4	8 17	1 1/2-2 1/4		1-1/4	1 1/2	5	8					
...	AC-K9	2-1/2	2-3/8	5/8	F.	1 1/2	45	1 1/2	45	341	AA	AA	0	TC	TC	156	0.15	0.26	5B.		Ad	A.	2 1/2	2 1/4	7 30	1 1/2-2		1/2-1	0-1/2	4 5 1/2	9					
...	AC-K9	2-1/2	2-3/8	5/8	F.	1 1/2	45	1 1/2	45	341	AA	AA	0	TC	TC	156	0.15	0.26	5B.		Ad	A.	2 1/2	2 1/4	7 29	1 1/2-2		0-1/2	0-1/2	5 3 1/2	10					
...	AC-G6	3-3/4	1-1/2	7/8	P.	1 1/2	45	1 1/2	45	341	AA	AA	0	TC	TC	113	0.21	0.26	4B.	1 1/2	Ad	B.	2 1/2	2 1/4	9 19	1 1/2-2		0-1/2	0-1/2	5 3 1/2	11					
...	AC-G6	3-3/4	1-1/2	7/8	P.	1 1/2	45	1 1/2	45	341	AA	AA	0	TC	TC	113	0.21	0.26	4B.	1 1/2	Ad	B.	2 1/2	2 1/4	10 24	1 1/2		1	1/2	4	12					
112	AC-K11	2-1/2	1-1/2	9/8	R.	1 1/2	30	1 1/2	30	3/4	0.06H	0.13H	0.06	9B.	3 1/2	133	0.21	0.32	5B.	1 1/2	Ad	A.	2 1/2	1 1/4	5 15	2 1/2 ± 1/2		1 ± 1/2	1/2	1/2	13					
112	AC-K11	2-1/2	1-1/2	9/8	R.	1 1/2	30	1 1/2	30	3/4	0.06H	0.13H	0.06	9B.	3 1/2	133	0.21	0.32	5B.	1 1/2	Ad	A.	2 1/2	1 1/4	5 15	0		1 ± 1/2	1/2	1/2	14					
112	AC-K11	2-1/2	1-1/2	9/8	R.	1 1/2	30	1 1/2	30	3/4	0.06H	0.13H	0.06	9B.	3 1/2	133	0.21	0.32	5B.	1 1/2	Ad	A.	2 1/2	1 1/4	5 15	0		1 ± 1/2	1/2	1/2	15					
...	AC-K9	2-1/2	2-3/8	5/8	F.	1 1/2	45	1 1/2	45	340	0.06H	0.08H	0.10	TC	TC	146	0.20	0.25	TC	TC	Au	A.	2 1/2	1 1/4	6 19	1 1/2		+	0-1/2	0-1/2	9 1/2	16				
...	AC-K9	2-1/2	2-3/8	5/8	F.	1 1/2	45	1 1/2	45	340	0.06H	0.08H	0.11	2B.	3 1/2	146	0.18	0.25	TC	TC	Au	A.	2 1/2	1 1/4	6 22	1 1/2		+	0-1/2	0-1/2	5 1/2	17				
...	AC-K9	2-1/2	2-3/8	5/8	F.	1 1/2	45	1 1/2	45	340	0.06H	0.08H	0.11	2B.	3 1/2	146	0.18	0.25	TC	TC	Au	A.	2 1/2	1 1/4	6 22	1 1/2		+	0-1/2	0-1/2	5	18				
...	AC-K9	2-1/2	2-3/8	5/8	F.	1 1/2	45	1 1/2	45	340	0.06H	0.08H	0.11	2B.	3 1/2	146	0.18	0.25	TC	TC	Au	A.	2 1/2	1 1/4	6 22	1 1/2		+	0-1/2	0-1/2	5	19				
...	AC-K9	2-1/2	2-3/8	5/8	F.	1 1/2	45	1 1/2	45	340	0.06H	0.08H	0.11	2B.	3 1/2	146	0.18	0.25	TC	TC	Au	A.	2 1/2	1 1/4	6 22	1 1/2		+	0-1/2	0-1/2	5	20				
...	Ch-J9B	2-3/4	1-1/2	3/4	F.	1 1/2	30	1 1/2	45	342	0.10H	0.10H	0.12	7 1/2	2 1/2	110	0.18	0.25	3B.		Au															
...	AC-K9	2-1/2	2-3/8	5/8	F.	1 1/2	45	1 1/2	45	340	0.06H	0.08H	0.10	TC	TC	146	0.20	0.25	TC	TC	Au	A.	2 1/2	1 1/4	6 19	1 1/2		+	0-1/2	0-1/2	9 1/2	21				
...	AC-K9	2-1/2	2-3/8	5/8	F.	1 1/2	45	1 1/2	45	340	0.06H	0.08H	0.10	TC	TC	146	0.20	0.25	5A.	2A.	Au	A.	2 1/2	1 1/4	5 15	2		+	0-1/2	0-1/2	9 1/2	22				
...	AC-K9	2-1/2	2-3/8	5/8	F.	1 1/2	45	1 1/2	45	340	0.06H	0.08H	0.11	5A	2B.	119	0.20	0.25	4A.	1 1/2 A.	Ad							+	0-1/2	0-1/2	9 1/2	23				
...	AC-K9	2-1/2	2-3/8	5/8	F.	1 1/2	45	1 1/2	45	340	0.06H	0.08H	0.11	5A	2B.	119	0.21	0.25	1 1/2 B		Ad							+	0-1/2	0-1/2	9 1/2	24				
105	Ch-C7	2-3/4	1-1/2	3/4	F.	1 1/2	45	1 1/2	45	3/4	0.13C	0.13C		9 1/2 B	3B.	112	0.13	0.25	4B.	1 1/2	Au	A.	2	1 1/4	5 22	7		3/4	1/2	1/2	8 1/2	25				
...	Ch-C7	2-1/2	2-3/8	5/8	R.	1 1/2	30	1 1/2	45	3/4	0.10H	0.10H	0.12	4 1/2 B	1 1/2 B	130	0.18	0.25	2B.	3 1/2	Au	A.	1 1/2	1 1/4	5 15	2 1/2		3/4	1	1/2	7 1/2	26				
...	Ch-14MM	2-1/2	2-3/8	5/8	R.	1 1/2	30	1 1/2	45	3/4	0.10H	0.10H	0.12	4 1/2 B	1 1/2 B	130	0.18	0.25	2B.	3 1/2	Au	A.	1 1/2	1 1/4	5 15 1/2	2 1/2		3/4	1	1/2	7 1/2	27				
...	Ch-14MM	2-1/2	2-3/8	5/8	R.	1 1/2	30	1 1/2	45	3/4	0.10H	0.10H	0.12	4 1/2 B	1 1/2 B	130	0.18	0.25	2B.	3 1/2	Au	A.	1 1/2	1 1/4	5 15 1/2	2 1/2		3/4	1	1/2	7 1/2	28				
...	Ch-J8	2-3/4	1-1/2	3/4	F.	1 1/2	45	1 1/2	45	3/4	0.06H	0.08H	0.10	10 1/2 B	3 1/2 B	107	0.20	0.22	TC	TC	Au	A.	1 1/2	1 1/4	6 13	2 ± 1/2		1-1 1/2	1-1 1/2	0-1/2	7	29				
...	Ch-J8	2-3/4	1-1/2	3/4	F.	1 1/2	45	1 1/2	45	3/4	0.06H	0.08H	0.10	10 1/2 B	3 1/2 B	107	0.20	0.22	TC	TC	Au	A.	1 1/2	1 1/4	6 13	2 ± 1/2		1-1 1/2	1-1 1/2	0-1/2	7	30				
107	Ch-C7A	2-3/4	1-1/2	3/4	F.	1 1/2	45	1 1/2	45	340	0.10	0.13	0.14	2B.	1 1/2 B	112	0.18	0.25	7B.	2 1/2	Ad	A.	2 1/2	1 1/4	6 18	1 1/2		1	1/2	1/2	7 1/2	31				
113	Ch-C7A	2-3/4	1-1/2	3/4	F.	1 1/2	45	1 1/2	45	340	0.06	0.13	0.14	1A.	1/4 A.	109	0.16	0.25	7B.	2 1/2	Ad	B.	2 1/2	1 1/4	8 21 1/2	1 1/2		1	1/2	1/2	8 1/2	32				
100	Ch-C15	2-1/2	2-3/8	5/8	F.	1 1/2	45	1 1/2	45	3/4	0.15	0.15	0.15	6A.	2 1/2 A.	145	0.20	0.23	10B	3B.	Au	A.	2	1 1/4	7 19	2 1/2		1 1/2	1/2	1/2	7	33				
...	AC-K9	2-1/2	2-3/8	5/8	P.	1 1/2	30	1 1/2	45	3/4	0.06C	0.09C	0.15	6A.	2 1/2 A.	145	0.15	0.25	5B.	3 1/2	Au	B.	2 1/2	1 1/4	7 18	2		1 1/2	1/2	1/2	4 1/2	34				
105	14MM	2-1/2	1-1/2	9/8	P.	1 1/2	45	1 1/2	45	311																										
105	Ch-18MM	2-1/2	1-1/2	9/8	P.	1 1/2	45	1 1/2	45	3/4	0.04C	0.06C	0.04	21B.	6 3/4 B.	116	0.20	0.22	7B.	2 1/2	Au	B.	2 1/2	1	12 32	1 1/2		3/4	1	1/2	8 1/2	35				
100	AC-K12	2-1/2	1-1/2	9/8	F.	1 1/2	45	1 1/2	45	372	0.15H	0.15H	0.15				0.20	0.25			A.	2	1 1/4	7 17 1/2	2 1/2		1 1/2	1/2	1/2	7	37					
90	AC-K12	2-1/2	1-1/2	9/8	F.	1 1/2	45	1 1/2	45	372	0.15H	0.15H	0.15				0.20	0.25	15B.		B.	2	1 1/4	8 21	2 1/2											



Yours for a PERFECT 36

**New Model Added
To Complete Line**



Every month during the new year is destined to increase and strengthen Hein-Werner leadership in the hydraulic jack field.

A sturdy, compact 20 ton capacity hydraulic jack has just been added to round out this very complete and popular line.

20 Ton Hydraulic Only \$30.00

New Model 20.10A will be welcomed by operators of heavy trucks and buses. This new jack is tested at $1\frac{1}{2}$ times rated capacity of 20 tons. Price is only \$30.00 net to dealer (\$31.00 West of Denver).

Other hydraulic jacks in this complete line include the "Bullet" 3,000 lb. capacity, \$2.80 . . . For truck and bus service a 3 ton capacity at \$7.95 . . . 5 ton models at \$9.95 . . . 7 ton models at \$13.45, a 12 ton at \$19.95 - - and a Hydraulic Bumper Lift Model for passenger cars at a new low price of \$4.95 . . . All prices are net to dealer, and slightly higher west of Denver.

HEIN-WERNER MOTOR PARTS CORP.

WAUKESHA, WISCONSIN

The modern Jill reproduced above made her debut by gracing the Hein-Werner 1936 calendar (shown in miniature) recently distributed to jobbers.



FEW MODELS ENGINEERED TO DO THE WORK OF MANY

HEIN-WERNER
MECHANICAL
AND HYDRAULIC **JACKS**

Diesel Servicing

(Continued from page 21)

The individual fuel pump system is similar to the rail system, but has individual pumps for each engine cylinder. This pump measures the fuel and also injects it into the combustion chamber. The Bosch pump and injection system used by many Diesel engine manufacturers is an example of the individual fuel pump system.

In the Cummins system the fuel is measured and delivered to an injector at pressures ranging from 75 lb. per sq. in. to 130 lb. per sq. in. by a single pump. After being measured and delivered to the injector, it is preheated and vaporized and then injected into the engine cylinder by a separate action.

Another engine of the heavy-fuel type is the Hesselman. In this engine the fuel is sprayed into the engine cylinder before the piston reaches top center. Following this a spark occurs at a spark plug which ignites the fuel. Naturally, the compression pressures in this engine are not as high as in the conventional Diesel or compression-ignition engines, otherwise the fuel would be ignited when injected into the cylinder.

Shop Appearance

(Continued from page 18)

The tire sales room has a capacity for the display of 1000 tires, with compartments for a companion volume of inner tubes and automotive accessories. It is fitted out with (white) chairs as a waiting room for patrons.

5. Another sales gesture of this layout is provided by space for large crews per car. Every automobile driven into the McKale gas aisle receives this voluntary six-over: 1—Checking the oil; 2—checking and correcting the air; 3—checking and servicing water in the radiator; 4—cleaning off running boards; 5—polishing windshield; 6—polishing rear glass. And the rendering of all of these services, plus filling the gasoline tank and supplying oil, if needed, is accomplished in just 31 seconds.

In short, every foot of the total area of 9000 sq. ft. contributes to the \$50,000 selling layout of this station: (1) by the ability to flag attention; (2) by creating an atmosphere of cleanliness, hospitality; (3) by providing visibility for all maintenance departments, thereby increasing suggestive selling; (4) by permitting the selling layout itself to speak more loudly than a medley of assorted signs; (5) by the provision of ample space for multiple service on one automobile at one time.

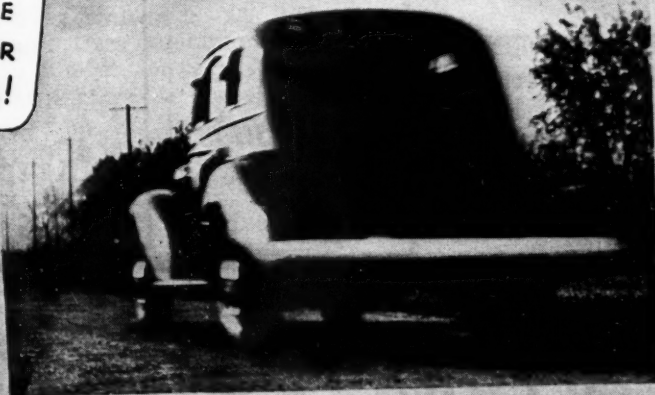
The POST and COLLIER'S Tell the Millions about the Billions

DID YOU KNOW THAT AMERICAN
BRAKEBLOK HAS BEEN USED ON
MORE HYDRAULIC BRAKES IN THE
LAST 3 YEARS, THAN ALL OTHER
BRAKE LININGS PUT TOGETHER!

SURE, I KNOW!
A RECORD OF
11 BILLION MILES
AS ORIGINAL
EQUIPMENT ALONE

ARE THERE
*Hydraulic
Brakes*
ELEVEN BILLION MILES ON HYDRAULIC BRAKES!
Most cars with hydraulic brakes
are quick on the getaway and fast on
the straightaway . . . When they stop
they have to stop fast.
During the past three years American
Brakeblok has been used as original
equipment on more hydraulic brakes
than all other brake linings combined.
American Brakeblok has rolled up a
record of over eleven billion miles on hy-
draulic brakes alone! . . . To say noth-
ing of its billions of miles on mechan-
ical brakes . . . This record is mounting
at the rate of twenty million miles a day!

WHAT FAST-STEPPING CAR OF YOURS?



The faster you go the more you have to trust your brake lining . . . All brake lining wears out, sooner or later.
With American Brakeblok it's generally later . . . When the lining on your brakes wears out, you'll want the relined
brakes to give you all the safety and all the fast stops that can be engineered into a brake lining . . . You can be sure of
this by definitely specifying American Brakeblok when you leave your car to have the brakes relined.



CUSTOMER: What's the best lining for hydraulic brakes? This is the
first one I've ever had with these.

SERVICE MAN: Well, sir, I've been putting American Brakeblok on hy-
draulic brakes for years, and I've never found anything to equal
it. It's the best lining for any brakes—hydraulic or mechanical
—and it's not the highest priced, either.

**American
Brakeblok**

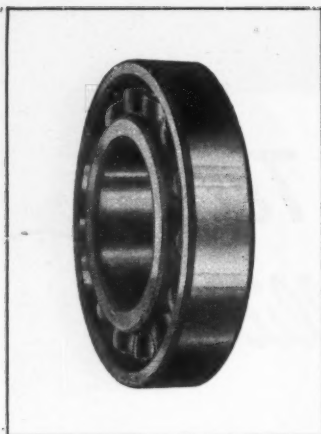


THE SAFETY BRAKE LINING

**American
Brakeblok**



THE SAFETY BRAKE LINING



24 hour exchange service

and you save
40%

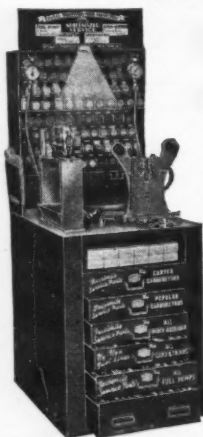
No matter what your location or bearing requirements might be, one of the 28 strategically located Ahlberg Branches can supply you with the type and size bearings you need—over the counter immediately or within 24 hours by mail.

Write for free booklet "The Story of Ahlberg Ground Bearings" and address of nearest branch.

AHLBERG BEARING COMPANY
321 East 29th Street, Chicago, Illinois

Ahlberg *Ground Bearings*
SERVICE PROVEN

THE ANSWER TO THE DROP IN REPAIR JOB VOLUME—



HERE ARE THE "5 POINTS"

- 1—FUEL PUMP PARTS
- 2—CARBURETOR PARTS
- 3—SPEEDOMETER PARTS
- 4—SHOCK ABSORBER PARTS
- 5—HY-FLEX OIL & GAS LINES

THE "5 STAR"

- EQUIPMENT**
- * Portable Fuel Pump Tester
 - * Bench Fuel Pump Tester
 - * Carburetor Tester & Float Level Gauge
 - * Vac-O-Scope, Portable Motor Analyzer
 - * Special Tools for Fuel Pump, Carburetor, Speedometer, Shock Absorber, etc.

HYGRADE'S • "5 POINT" SERVICE UNIT

Repair jobs are becoming more and more scarce. With cars running to an average of 100,000 miles, overhaul work has fallen off to an alarming extent during the past year or two.

What is the answer? Hold on to the repair work you have—and **BUILD UP YOUR REVENUE BY SPECIALIZED SERVICE IN NEGLECTED BUT PROFITABLE FIELDS.**

Hygrade shows you how in the "5 POINT" SERVICE UNIT. A Stock Cabinet, Display Merchandiser, Clinic and Work Bench in one, with **COMPLETE TESTING APPARATUS** and the necessary parts to take care of 95 per cent of the repair jobs listed at left. Each a paying business in itself! A set-up that will more than compensate you for the falling-off in general overhaul jobs.

DON'T DELAY. Ask your Jobber to show you this new money-making unit. If he hasn't stock, it be sure to send us his name.

HYGRADE PRODUCTS CO.
516 West 34th Street,
New York, N. Y.



FASTIK RAPID-DRYING TOUCH UP COLORS TO MATCH

1935 CHEVROLETS

Factory Standard Colors. Dries Dust Free in 5 Minutes. Sticks fast over bare metal, lacquer, synthetic enamel, etc.

ATTRACTIVE DEALER DISPLAY

12 cans—12 colors. Brush and Sandpaper with each can. Top of Can Colored to Match Contents.

Retail Price 60¢ Can

Dealer's Cost \$4.32 per Display. Ask your jobber or send \$4.32 to the factory, and this Display Assortment will be sent to you at once, from your nearest jobber.

SOLD ONLY BY LEADING JOBBERS

H. R. THOMSON, INC.

1059-73 East 76th St.
Chicago, Illinois



★ A complete line of replacement springs, helper springs, and spring parts for all popular makes of cars and trucks. Built right, engineered right, priced right.

Write for catalog, prices, and complete details

TRAINOR

NATIONAL SPRING COMPANY
New Castle, Indiana



—IS ALWAYS AT
WORK WHEN



VALVE PACKING

is installed. Result: automatic take up of any wear on packing and **CONTINUOUS** protection against oil pumping past intake valve stems.

LINENDOLL CORPORATION

228 N. LaSalle St.

Chicago, Ill.

Classified

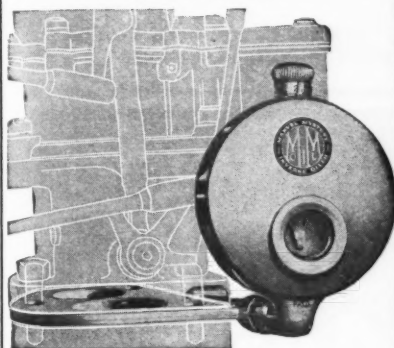
PATENTS—SMALL IDEAS MAY HAVE large commercial possibilities. Write immediately for information on how to proceed and "Record of Inventions" form. Delays are dangerous in patent matters. Clarence A. O'Brien and Hyman Berman, 68-X Adams Building, Washington, D. C.

PATENTS—TRADEMARKS. Instruction "How to Establish Your Right" and form "Evidence of Conception"—sent **FREE.** Lancaster, Allwine & Rommel, 415 Bowen Building, Washington, D. C.

BARGAINS: USE GARAGE, SERVICE STATION EQUIPMENT. WRITE US YOUR NEEDS. STANDARD AUTOMOTIVE EQUIPMENT COMPANY, 3117 ROOSEVELT RD., CHICAGO, ILL.

MARVEL Mystery Inverse OILER

For Top Cylinder
Lubrication



Model O-G

Intake Manifold Installation
Special for Ford V-8

RESERVOIR ONE QUART CAPACITY

Watchlike in construction, fundamentally and scientifically correct in operation, feeding oil only when oil is needed, eliminating excessive wear and keeping valves and pistons in an ideal condition. Whenever the intake vacuum increases or decreases, due to varying motor load and speed, the oiler will keep in perfect step—always delivering the quantity of lubricant required by the motor to eliminate sticky valves and prevent excess cylinder wear, feeding Marvel Mystery Oil into the intake manifold for top cylinder lubrication.

Both the O-G Model and T Model are quickly and easily installed under-the-hood.



Model "T"

Operates like the Model O-G. Easily installed under-the-hood, full two-quart capacity. Comes complete including fitting for any make of car or truck. Here is your opportunity to sell superior top cylinder lubrication! Marvel Mystery Oil is specifically made for this purpose.

Marvel Mystery Oil is especially recommended for any bearing metal or piston plating. Recommend its use which insures you a steady repeat business.

Order through your Jobber and Specify Name and Model of Car or Truck.

EMEROL MFG. CO., INC.

242 West 69th St., New York City

Increase Service Sales

(Continued from page 37)

sale, that's the end of it, but if he makes a sale of the \$16.50 one, he is credited with 50 points. If he sells the \$22.50 number, he gets a point credit of 150, and so on. (There is small office detail in this connection, the bookkeeper merely going through the sales tickets for the day and posting credits to each man's account.)

Purpose: To place a day-in and day-out emphasis on the selling of quality sales and service; to convince the men that it can be done; to achieve volume on the merchandise with the higher prices and the higher profits.

Prizes: Each man's total credit in POINTS is totaled at the end of the month and small bonus awards made to men with three largest totals. All departments and types of service in the usual super station fit in with this idea. There is a varying point schedule, for example, on tires beginning with the \$12.50 number, on batteries beginning at \$11.50. The spread is made broad enough to insure the salesman getting into real quality before he earns a point bonus.

Extra Sale Drive

Plan: To name a "drive item" for each week—an item to be the "extra sale." (Note the departure from the term "suggestive scale" which is not as strong as EXTRA SALE nor is it as expressive of what is actually meant.)

Purpose: To put the promotional spotlight on ONE item every week. Which means that the sales staff gets the idea that every phase of automotive sales and service readily lends itself to the EXTRA SALE—that they learn to sell by suggestion.

Prizes: Cash or merchandise award given to man selling the largest total of the drive item.

Collective Quota System

Plan: To have all members of the sales staff work collectively toward a monthly quota, established for the entire firm for the month, in dollars and cents. If the quota is reached, every man gets a specified bonus. If it is NOT reached, nobody gets a bonus.

Purpose: To alleviate "lone wolf" selling; to build team-work. There are any number of ways that occur to co-operate with the house and the other members of the staff, when the collective "kitty" is at stake!

IT REALLY



**THE HARD
STEEL SEATS**



Thin PEP a trifle with water and use it to grind a hard steel valve seat.

Next, try one of the cheap competition grade grinding compounds on the same job.

Then you'll know why PEP is the choice of the old timers who have been all through the racket of trying to buy something as good as PEP—at any price.



No mechanic ever bought any gasket paste that is "just as good" as GASKET GOO because there ain't no such animal. If you expect permanently leak-proof joints every time, quit taking chances—insist on GASKET GOO. And get away from the headache of re-opening joints sealed with pastes that over-cement parts together.

SEND COUPON NOW FOR FREE SAMPLE

ATTACH BUSINESS CARD OR BILL-HEAD TO THIS COUPON FOR A BIG SAMPLE

PEP MFG. CO., INC.

33 W. 42nd ST., NEW YORK

CHECK FREE SAMPLE WANTED

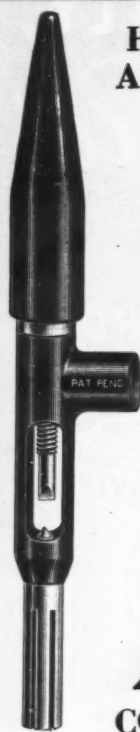
☐ GASKET GOO

☐ PEP GRINDING COMPOUND

NAME _____

M. A. 1

ADDRESS _____



How Far Can A Spark Jump ?

That is the only test that tells exactly the condition of coil and connections. A & C Coil Tester tells just how far the spark jumps. Carry one in your vest pocket or in your electric repair kit. It will do more to sell new distributor parts, coils and wire than an hour's talking to each customer.

**Introductory
price
\$1.00**

Ask your jobber for one now. Ten on a card to sell to "tinkerers" will pay you a rich profit. Ask about it.

A & C COIL TESTER

A & C Mfg. Co.
1613 N. 18th Street
Philadelphia, Pa.



This shows how to use it. Plug the coil secondary wire in the side socket; set the Tester in a distributor socket and watch the spark jump as you turn the measured screw.



HACKETT Universal ROLLER
FIG. 2 7 PLY BLADE FIG. 3
FOR AUTOMATIC WINDSHIELD CLEANERS WIPES CLEAN

NOW IN BIG DEMAND
New Type Universal Blade, fits all arms. Blade rolls in action, no bending of rubbers. 7-ply wiping features give 100% wiping, therefore, clear vision at all times.

HACKETT PRODUCTS CO., INC. U. S. A.
Providence, R. I.

Mfrs. of Wiper Arms, Dual Wiper Attachments, Inside Wipers, License Plate Frames, Cigar Lighters, Magnetic Trouble Lights, Shimmy Stops, Parking and Fender Guides, etc.

STEER - O - MASTER — MODEL B —

**NEW—COMPACT—COMPLETE
LOWER IN PRICE**

Same accuracy and precision as original STEER-O-MASTER. Less floor space. Lower price. Write for details.

RIESS MANUFACTURING CO.
Kokomo Indiana U. S. A.

Making Midget Motors

(Continued from page 25)

same as the diameter of the valve seat at the top. To reduce the likelihood of exhaust valve sticking, it is well to counter-bore the guides down about 1/2 in., removing 0.004 to 0.005 in. of material. Valve springs should be stiffer than regular production springs originally used on the job, and should be carefully checked for uniform tension, replacing any weak springs.

While the factory specifications for valve timing doubtless insure good all-round performance, it is possible that moving the cam gear ahead one tooth will increase top speed. The only way to find out is to try. Ignition timing is best set on the road by test, in view of the changes made.

The combustion chamber should be scraped to remove all rough spots and sharp edges in the casting that might cause pre-ignition. Then, by dressing off the head or block it is possible to raise compression, and as a result, increase top speed. This should be done carefully, removing not more than 1/16 in. at a time until you reach a point where the engine is still free from detonation with the fuel that will be used, but another cut would be too much. Having altered the compression ratio, it is necessary to experiment with different spark plugs to find the type best suited to that particular job at high speed operation. Generally speaking, regular passenger car plugs get too hot when driven at high speed, but on the other hand, racing car plugs foul when the car is driven moderately. When a plug is right the porcelain should show a light tan, and the shell be a little oily after 5 or 10 miles at high speed. A white insulator indicates a plug is too hot, while a very dark color means that the plug is too cool.

Breaker points should be set closer for high speed work than for ordinary running. This is to increase their period of contact in order to give the ignition coil more time to build up. Most race jobs have both the ignition points and spark plug gaps set at 0.018 in. Due to the higher revolutions per minute these jobs usually turn up, most drivers prefer a magneto system to the conventional battery type, feeling that there is a more dependable and hotter spark.

Obviously, the crankshaft, connecting rods and pistons should be balanced. All excess weight on the connecting rods, such as forging numbers, should be carefully machined off. The flywheel is usually cut down about one-third of its original weight, as the principal value of the flywheel lies in the slower speed operation, and is not needed so much at high speed.

Clearances on main and connecting rod bearings should be 50 per cent

(Continued on page 79)

CORD

**QUALITY
IN EVERY
DETAIL**

AUBURN AUTOMOBILE COMPANY
AUBURN, INDIANA

★ ★ ★ FOR ALL TYPES OF BRAKES

EVANWOOD BRAKE TESTER AND BALANCER

\$44.50 complete
LIST READY TO USE
NOTHING ELSE TO BUY
FREE ADVERTISING BANNER

C. & C. SALES CORP. 1775 BROADWAY
Exclusive U. S. Sales Agents NEW YORK CITY



Sectional Piston Rings Eliminate Reboring

Champion Multi-section Piston Rings give sensational performance. Results guaranteed or your money back. Write for circular and trial installation offer.

CHAMPION PISTON RING CO.
11629 LINWOOD DETROIT, MICH.

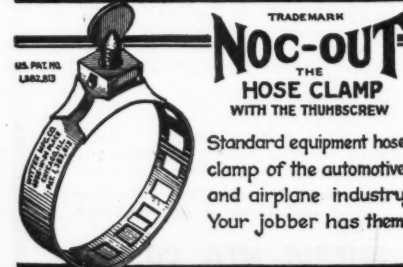
LINKERT

The
**WORLD'S OUTSTANDING
CARBURETOR**
and
PERFECT PARTS

Replacement Line
for All
Popular Carburetors

LINKERT CARBURETOR CO.
INDIANAPOLIS, INDIANA

A Tight Connection All the Time



4307 W. 24TH PL. **WITTEK**
CHICAGO, ILL. MFG. CO.

Watch for the J-M SAFETY SCHOOLS

● J-M Safety Schools touring the country to help reduce accidents are only part of our great promotion plans for boosting your business in 1936. Get details from Johns-Manville, 22 E. 40th St., N. Y. C.

JOHNS-MANVILLE BRAKE LININGS

MODERNIZE with ALEMITE

Modern Alemite Lubrication Equipment . . . Alemite Temprite Lubricants . . . Alemite High-Speed Motor Oil . . . and Alemite's sales-building displays will help you make more money from modern motorists who take pride in today's motor cars. Write in for complete information.

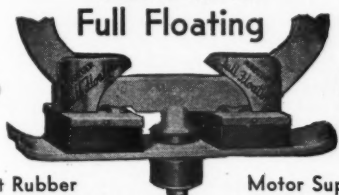
ALEMITE
A Div. of Stewart-Warner Corp'n.
1862 Diversey Parkway, Chicago, Ill.

EVERY A-AA FORD OWNER NEEDS THIS NEW—

KREGER No. 308

Full Floating

List \$1.00



Front Rubber Motor Support

STOPS BREAKAGE—VIBRATION—RATTLES—Easy to install in five minutes.

*Special offer—Send a Dollar Bill for 2 No. 308s. They will be mailed prepaid on approval. U.S.A. only.

L. F. KREGER MFG. CO., 2262 Archer Ave., Chicago

RICH SILCROME VALVES

Quality GEARS

•• ALL GEARS NEATLY PACKAGED! ••

A Better Replacement Gear Service.

**NEW PROCESS
GEAR CORPORATION**
SYRACUSE, NEW YORK

(Continued from page 78)

greater than factory specifications, pins should be a very light drive fit, and ring end gap should be twice that allowed for ordinary service. This will result in piston slap particularly when the engine is cold, but friction is reduced and power is increased. Camshaft bearings and distributor bushings should come in for special attention also; 50 per cent additional clearance should be provided.

If a splash system of lubrication is used, it would be advisable to convert it to a pressure system by connecting an oil distributing manifold to the pump, and to each main bearing. Cut grooves in the main bearings to insure an equal distribution of oil over the entire bearing surface. Then it would be necessary to drill the crankshaft from each main bearing to the adjacent connecting rod bearings to allow oil under pressure to be fed to the rod bearings, which should be grooved to insure even distribution of oil. Oil dippers on the rods should be ground off and the oil holes filled with babbitt.

Many midge builders are adopting motorcycle engines for the power plant, and there are a number of reasons in favor of this practice. The weight advantage is obvious, when comparing the weight of a motorcycle engine with that of the conventional water-cooled engine. As far as displacement is concerned, there are no changes to make—a Harley-Davidson 74 cu. in. job or the newer 80 cu. in. job both come within the displacement limits of the various Associations. Immediately, the problems of weight, displacement and speed are solved.

The engine is usually mounted in the chassis by using its regular mountings and part of the frame removed from the motorcycle. It is so attached that it is adjustable fore and aft to allow for adjusting the drive chain. The regular motorcycle clutch is used, mounted to a jack-shaft located in a bracket fastened to the frame side rail about midway of the chassis. A drive chain runs from the motor to a sprocket on the jack-shaft, and another chain runs from a sprocket on the other end of the jack-shaft to a sprocket on the rear axle shaft.

The type of final drive varies according to the ideas of the builder. Some remove the bevel ring gear and rivet the chain sprocket in its place, thereby utilizing the differential action of the gears. Others prefer to lock up the spider gears and drive as though through a solid shaft, while still others actually use a solid rear axle shaft and thereby eliminate the weight of the differential assembly.

Outboard motor boat engines are also popular, but in general are more difficult to mount in the chassis. Performance, however, has been exceptionally good.

new 1936 model

The NIAGARA

BRAKE RELINER

Special grinding fixtures for Chevrolet, Ford and Plymouth brake shoes furnished at slight additional cost.

only
\$52.50

● The Niagara is a sensational value in a low priced brake reliner. Complete—fast—profitable. Surplus power and large riveter throat. Hardened link connection between lever and plunger in riveter head prevents wear and turning. 8 quick-change tools. 6-compartment rivet tray. V-belt driller. Fully machined grinding table—cushioned abrasive. Special grinding fixtures center shoe and grind to positive arc. Fixtures quickly removed for other work.

FIXTURE PRICES

Extension for mounting fixtures, \$2.50
Chevrolet, Ford and Plymouth grinding fixtures, each, 7.50

Ask your jobber or write direct.

CHICAGO RIVET & MACHINE CO.
1844 So. 54th Ave. (Cicero P. O.) CHICAGO

Chicago

MOST COMPLETE LINE
OF RIVETS AND BRAKE
SERVICE EQUIPMENT


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The American System of Enterprise

(Continued from page 61)

Now we are told that all this progress toward better living for all, together with the system, which brought it about, must be abandoned at once. It is not exactly clear what is to be substituted for it by the incurably hopeful experimenters. They would, without further thought, cast aside a social, political and economic organization perfected by 150 years of transcendent national genius.

Intelligent Americans have listened in wonderment as the false prophets who always spring up in the hours of great confusion and distress swayed millions by their unproven libels upon our established economic institutions. When their hold upon the credulous and unhappy masses could not be maintained by sheer abuse of the system they came forward with their schemes for dividing the wealth of the nation, for unearned old-age incomes, for regulating the banks out of existence.

But we still have with us a far more powerful party dedicated to the negation of individualism, which is America—nothing less than the executive and legislative sections of the Government itself.

We do not propose, here, to take part in a political controversy. It is not necessary. We have set out to show what the American system of enterprise is and why it will continue with renewed strength despite the aberrations of political leaders and the setbacks of a world depression.

We have seen that the essential elements of this system of ours are individualism, initiative, industry and independence. Because that is so, it follows that the system itself cannot die until those four are destroyed.

Individualism and initiative are the marks of all true Americans today, as always. Not one of them would voluntarily submit to a system of government which would dole out to them the necessities of life.

The only classes who really want such regimentation, here, are the hereditary goose-steppers, transplanted from Europe.

(Continued on page 81)

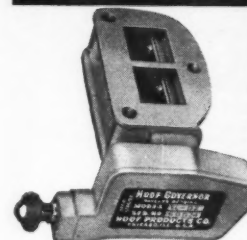
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(Continued from page 80)

The great majority of business men, from the proprietor of an automotive repair shop to the president of General Motors, have continued on their independent way, trying to keep the income a little ahead of the outgo, by the exercise of all the ingenuity and initiative they possess. In the beginning, when codes were proposed as a method of distributing work among more persons, all classes did their best to cooperate. When the codes were decently interred, the typical business man shrugged his shoulders and went back to the task of trying to make a little money in the way he had learned during half a lifetime.

It is upon that spirit that the American system of enterprise has been reared, and it is that same spirit which will see us through this crisis and others, as they come.

An invention, however awe-inspiring, is no sooner completed than a whole, astounding network of manufacturing, publicizing and distributing organizations springs up almost over night. If it is something all can use, everyone wants it, and presently prices come down and terms are arranged so that everyone can get it.

Enterprise is the word for this system—enterprise on the part of those who think up new ideas, plans and devices to make life for all more interesting, more comfortable and more useful; enterprise on the part of those who create the manufacturing system to carry out the ideas, with their money, work and machines, and enterprise on the part of the selling organizations with their genius for creating, satisfying and continuing a demand. It is in this determined spirit of the people of the nation to seek constantly and unrelentingly for better and higher standards of living, that the seeds of self-perpetuation of the American system of enterprise are carried.

There is every valid reason to believe that the wheels of this great machine of ours are turning over a little faster each month. Nearly half our manufacturing plant is obsolescent and must be rebuilt; housing for two million and a half families must be constructed; all the other things, which have been wearing out, clothes, cars, household goods, must be replaced.

Here is another flood, which has been rising steadily for more than five years. When it breaks loose, as it must shortly, our friend John Citizen will wonder why he ever had the faintest doubts about the invincible power of the American system of enterprise to go on adding to the wealth and happiness of the American people.

James B. Wagstaff was named general sales manager of the De Soto Motor Corp. in a recent announcement by Byron C. Foy, president of the company.

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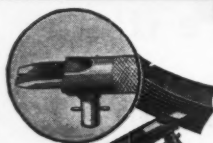
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Clutch Chatter

(Continued from page 29)

this adjustment, it is necessary that a gage plate having a center hub be inserted in the flywheel in place of the driven plate, and the pressure plate and cover assembly bolted in position. A straight-edge placed across the top of the gage plate hub makes it possible to check the clearance between the straight-edge and the ends of the levers, which can then be adjusted for any desired position. Regardless of the amount of clearance given, the levers must all be within .005 in. of each other in order to insure an even travel of the pressure plate. This point should always be checked before a new driven plate is installed, as it is the only adjustment provided for the clutch operation aside from the pedal clearance, and is apt to change considerably due to wear on the release levers. When overhauling a clutch of this type, it is always advisable to replace the three levers, as the proper setting of the levers would be at best only a temporary relief if an appreciable amount of wear already exists, and the job will come back in a short time.

Naturally the simplest method of adjusting these fingers is to use special clutch rebuilding equipment.

Another point that is frequently overlooked in attempting to correct an unsatisfactory clutch condition is the amount of wear that has taken place on the splines of the clutch shaft. If the splines are worn so that they are no longer square, the splines in the new clutch hub will not fit properly but will bear only on the ends or at the points of least wear. In a short time these points will wear down, as the splines in the hub attempt to wear in to a fit with those of the shaft, with the result that the hub assumes a misaligned position relative to the body of the plate. This position changes constantly during each revolution, and will eventually result in breakage of the clutch plate at the hub.

Clutch grabbing is a condition often combined with chatter, and the contributing causes are similar, with the addition of a binding of the moving parts of the clutch, and an accumulation of oil and grease on the facings. Dragging and slipping cause their share of trouble, but are usually the results of lack of maintenance.

It sometimes happens that after a new clutch plate has been installed and the alignment carefully checked, the car will jerk, shudder and chatter badly when starting; more so than with the old plate. This is due to the fact that clutch slippage has been eliminated, and power impulses from the engine are more pronounced. If the engine is not properly tuned and is firing unevenly, or if the rubber engine mountings have become settled as is usual after a period of service, the engine vibration is transmitted

(Continued on page 83)

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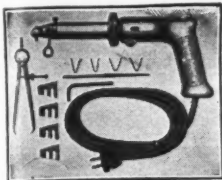
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SINKO TOOL & MFG. CO.
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(Continued from page 82)

throughout the entire car when power is applied to the clutch. Obviously, the thing to do is to properly tune the engine and replace the engine mountings with new ones of live rubber that will help to absorb this vibration.

Slippage sometimes develops in cars equipped with a vacuum operated automatic clutch, when the automatic action is not being used and the clutch is being operated manually. This can be traced to the small shut-off valve on the vacuum line between the intake manifold and the vacuum operated cylinder. If it does not seat properly due to wear, corrosion or a small particle of dirt, a partial vacuum gradually builds up in the operating cylinder and moves the piston sufficiently to throw the clutch partly out of engagement, allowing the slippage to take place. The remedy is to overhaul the leaky valve.

Another factor that should not be overlooked is that the new clutch plate is not always perfect. Manufacturing errors might escape the final inspector, with the result that occasionally a new plate might be turned out with a distorted disk so that the hub would be out of line with the facings. A new plate should always be inspected before it is installed.

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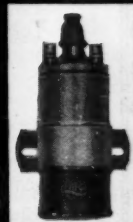
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Advertisers' Index

A		G		P	
A & C Mfg. Co.	78	Gardiner Metal Company	81	Pep Manufacturing Co., Inc.	77
Acheson Colloids Corporation.....	15	General Electric Company.....	71	Perfect Circle Co. ....2nd Cover, 1	
Ahlberg Bearing Company.....	76	Graham-Paige Motors Corp.	6	Pontiac Motor Co.	48-49
Alemite (A Div. of Stewart-Warner Corp.)	79	Gulf Refining Company	59	Prest-O-Lite Battery Co., Inc.	82
Allbestos Corporation	82	H		R	
Allied Manufacturers, Inc.	83	Hackett Products Co., Inc.	78	Ramsey Accessories Mfg. Corp., Back Cover	
American Brakeblok	75	Hastings Mfg. Co.	83	Raybestos Div. of Raybestos-Manhattan	12
American Chain Co., Inc.	2	Hein-Werner Motor Parts Corp. ..	64	Riess Mfg. Co.	78
Armature Co., The	86	Hobart Brothers	81	Russell Mfg. Co.	80
Auburn Automobile Company	78	Hoof Products Co.	80	S	
Automotive Thrust Bearing Corp..	80	Hygrade Products Co.	76	Sealed Power Corp.	16
Auto Specialties Manufacturing Co.	81	I		Service Spring Co.	82
B		Imperial Brass Manufacturing Co.	86	Shurhit Products, Inc.	80
Bear Mfg. Co.	14	J		Simmons Mfg. Co.	85
Becker Bros. Carbon Company....	81	Johns-Manville	79	Sinko Tool & Mfg. Co.	83
Belden Manufacturing Company..	81	Johnson Piston Ring Co.	82	Steelcraft Piston Ring Sales, Inc..	81
Bendix Products Corporation	57	K		Stromberg Motoscope Corp.	74
Black & Decker Mfg. Co.	13	Kreger Mfg. Co., L. F.	79	T	
Blackhawk Mfg. Co.	49	L		Thompson Products, Inc.	70
Blackstone Mfg. Co.	80	Lafayette Hotel (Buffalo, N. Y.)..	74	Thomson, H. R., Inc.	76
Buell Manufacturing Company....	82	Linendoll Corp.	76	Trainor National Spring Co.	76
C		Linkert Carburetor Co.	78	Tung-Sol Lamp Works, Inc.	74
C. & C. Sales Corporation.....	78	Lion Products Co.	82	U	
Champion Piston Ring Company...	78	Loney Co., Harley C.	86	United American Bosch Corp.	11
Chevrolet Motor Co.	67	M		United States Asbestos Div. of Raybestos-Manhattan, Inc.	7
Chicago Rivet & Machine Co.	79	McCord Radiator & Mfg. Co.	5	V	
Chilton Flat Rate	72-73	McKay Company, The	82	Van Norman Machine Tool Co...	83
Chrysler Corp.	8	Motor Improvements, Inc.	81	Vaughan & Bushnell Mfg. Co.	80
Covered Wagon Company	61	N		Victor Manufacturing & Gasket Co.	9
Crescent Cable Co.	79	National Machine & Tool Co.	82	Vellumoid Co., The	83
Cropley "Instruments"	80	New Process Gear Corp.	79	W	
D		Niehoff & Company, C. E.	83	Wagner Electric Corp.....3rd Cover	
Defiance Spark Plugs, Inc.	68	Norma-Hoffmann Bearings Corp..	84	Walker Mfg. Co.	10
E		Norwich Tool Co.	83	Weaver Mfg. Co.	80
Edison-Splitdorf Corp.	81	O		Weidenhoff, Joseph, Inc.	80
Electric Heat Control Co.	86	Okonite Co., The, Newtype Auto-		Wilcox-Rich Corp.	79
Electric Soldering Iron Co., Inc..	81	motive Division	69	Wilkening Mfg. Co.	65-66
Electric Storage Battery Company	51	Olds Motor Works	54-55	Winfield Carburetor Co., Ltd.	80
Emerol Manufacturing Co., Inc....	77	P		Witteck Manufacturing Co.	78
Exide Batteries	51	F			
F		Fitzgerald Manufacturing Co.	82		
Ford Motor Co.	3	Fostoria Pressed Steel Corp.	80		
Fostoria Pressed Steel Corp.	80	Fulton Company	83		

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